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EQUITY® 386/25 PLUS

User's Guide



FCC COMPLIANCE STATEMENT FOR AMERICAN USERS

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

WARNING

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. It is the responsibility of the user to obtain and use a shielded equipment interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectriques édicté par le Ministère des Communications du Canada.

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1. Read all of these instructions and save them for later reference.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
8. This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
9. Do not locate this product where the cord will be walked on.
10. If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.

11. Never push objects of any kind into this product through cabinet slots, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
12. Except as specifically explained in the User's Manual, do not attempt to service this product yourself. Opening or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.
13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - A. When the power cord or plug is damaged or frayed.
 - B. If liquid has been spilled into the product.
 - C. If the product has been exposed to rain or water.
 - D. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
 - E. If the product has been dropped or the cabinet has been damaged.
 - F. If the product exhibits a distinct change in performance, indicating a need for service.

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Glossary

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Introduction

The Epson® Equity® 386/25 PLUS is a high-performance personal computer which offers exceptional speed and convenience in a compact design. The computer's 25 MHz 80386 microprocessor makes all your programs run extremely fast, even when supporting multitasking operations.

Your system includes 2MB of internal memory, a built-in 'VGA (video graphics array) display adapter, built-in parallel and serial interfaces, an IBM® PS/2™ compatible mouse port, and four standard option slots (three 16-bit and one 8-bit). These interfaces allow you to connect most of your peripheral devices directly to the computer, so you do not have to install option cards. You can use the option slots to install additional devices, such as a modem or a networking card.

Your computer can support up to three internal drives: either two diskette drives and one hard disk drive, or one diskette drive and two hard disk drives.

The Equity 386/25 PLUS offers several other features to enhance the speed and versatility of your computer:

- ❑ Memory caching. Portions of your system memory are copied to a high-speed cache buffer so your computer can access programs and data very quickly.
- ❑ Shadow RAM. Your system ROM (read-only memory) and video ROM are copied into the computer's 32-bit RAM (random access memory) to further accelerate system performance.
- ❑ Extended and super-extended VGA modes. The built-in VGA adapter and VGA drivers (included) provide graphics resolutions up to 1024 x 768 in 16 colors or 640 x 480 in 256 colors on compatible VGA monitors.

Optional Equipment

You can easily upgrade your computer by installing additional memory and adding optional devices compatible with the IBM Personal Computer, PC XT,TM or PC AT.[™]

By adding memory modules to the main system board, you can expand the computer's memory up to 16MB. Memory modules are efficient because they eliminate the need to use an option slot to add memory to your system. Your computer can also access memory on modules faster than memory on an option card.

You may also want to install a math coprocessor in your computer to speed up calculations in certain application programs. You can add an Intel[®] 80387 (25MHz) or a Weitek[®]3167 (25MHz) math coprocessor; or you can add both by installing a Weitek dual-coprocessor adapter. Check with your authorized Epson dealer to see which options are available.

Operating Systems and Other Software

You probably have a version of MS-DOS[®] to use with your computer. Epson has enhanced MS-DOS by adding two time-saving utilities-HELP and MENU-that make it easier to use. The HELP program lets you display information on the screen about any MS-DOS command. MENU provides an easy way to run many of these commands.

Note

MS-DOS is not the only operating system you can use with your computer. You can run practically any operating system compatible with MS-DOS, MS[®] OS/2, Unix[®] or XENIX[®]. If you use another operating system, however, refer to the documentation that came with it to install and run it on your computer.

You can use virtually any application program designed for the IBM PC, PC XT, PC AT, or compatible computers on your Equity 386/25 PLUS. You may also use powerful 32-bit software—such as Microsoft Windows/386™—with your computer.

VGA Utilities

Epson has provided special VGA utilities and device drivers that you can use with certain standard VGA monitors and multi-frequency monitors. Using these drivers, you can take advantage of extended and super-extended VGA features such as 16-color graphics mode resolutions up to 1024 x 768, 256-color resolutions up to 640 x 480, and 132-column text mode.

How to Use This Manual

This manual explains how to set up and operate your computer, install options, and run diagnostics checks. Although the illustrations show a computer with a 5¼-inch diskette drive, instructions are included for using a 3½-inch drive.

Note

This manual covers basic operating instructions for using your computer, but does not explain how to use MS-DOS. See your MS-DOS manuals for comprehensive instructions on installing and using the operating system.

You do not need to read everything in this book; see the following chapter summaries.

Chapter 1 provides simple step-by-step instructions for setting up your system. On the back cover foldout are illustrations showing the different parts of your computer; refer to these as you set up your system.

Chapter 2 describes how to run the Setup program to define your computer's configuration. Do this before you use your computer. You may need to do it again later if you change the configuration.

Chapter 3 provides instructions for important operating procedures, such as using and caring for disks and disk drives.

Chapter 4 describes specialized features you can use to enhance your system's performance.

Chapter 5 describes some of the options you can use in your computer and contains instructions for removing the cover, setting jumpers, and installing options.

Appendix A provides instructions for using the VGA device drivers and utilities.

Appendix B explains how to install and remove a hard disk or diskette drive.

Appendix C describes how to perform a hardware-level format on a hard disk. You need to do this only if you have installed a new hard disk that has never received this type of low-level format, or if you are having serious problems with the disk.

Appendix D contains troubleshooting tips.

Appendix E outlines the system diagnostics checks. If you are having trouble with any part of the hardware, you may want to run some of these.

Appendix F gives the technical specifications for the computer.

At the end of the manual, you'll find a glossary and an index.

Where to Get Help

Customer support and service for Epson products are provided by a network of authorized Epson dealers and Customer Care Centers throughout the United States. Epson America provides product information and support to its dealers and Customer Care Centers.

Therefore, we ask that you contact the business where you purchased your Epson product to request assistance. If the people there do not have the answer to your question, they can obtain it through our toll-free dealer support program. Epson is confident that this policy will provide you with the assistance you need.

Call the Epson Consumer Information Center at (213) 782-2600 for the following:

- Your nearest Epson dealer
- The nearest Customer Care Center.

To locate or purchase accessories or supplies, contact your nearest Epson dealer.

Chapter 1

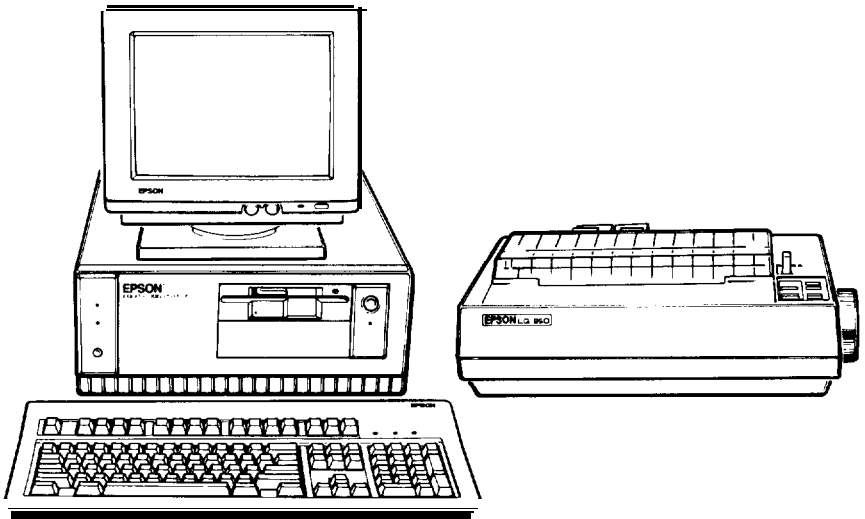
Setting Up Your System

Setting up your Equity 386/25 PLUS personal computer is easy. Just follow the eight steps in this chapter. As you set up your computer, you may want to leave this manual's back cover foldout open so you can refer to the illustrations identifying the different parts.

Note

The illustrations in this manual show the computer with a 5¹/₄-inch diskette drive. If your system has a 3¹/₂-inch diskette drive instead, and you need additional instructions, see Chapter 3.

1 Choosing a Location

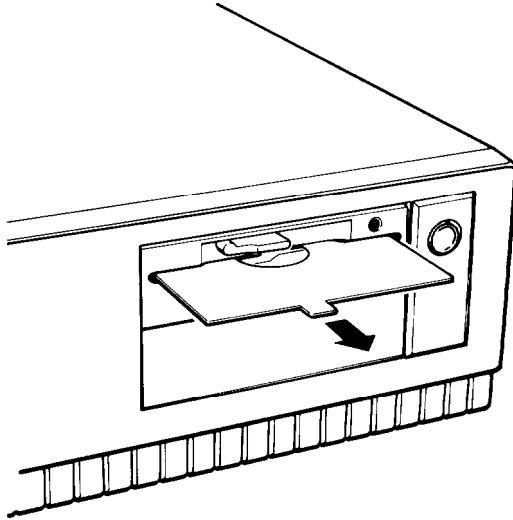


Before you set up your computer, it's important to choose a safe, convenient location that provides the following:

- ❑ A large, sturdy desk or table. The surface should be strong enough to support the weight of your system and all of its components. Select a location that allows plenty of space so you can work comfortably.
- ❑ A flat, hard surface. Soft surfaces like beds and carpeted floors attract static electricity, which can erase data on your disks and damage the computer's circuitry. Soft surfaces also prevent proper ventilation.
- ❑ Good air circulation. Air must be able to move freely under the system and behind it. Leave several inches of space around the computer.
- ❑ Moderate environmental conditions. Protect your computer from extremes in temperature, humidity, dust, and smoke. Avoid direct sunlight or any other source of heat. High humidity also hinders operation, so select a cool, dry area.
- ❑ Appropriate power sources. To prevent static charges, connect all your equipment to three-prong, 120-volt *grounded* outlets. You need one outlet for the computer, one for the monitor, and additional outlets for a printer and any other peripherals.
- ❑ No electromagnetic interference. Locate your system away from any electrical device, such as a telephone, which generates an electromagnetic field.

2 Removing the Protector Card

If you have a 5¼-inch diskette drive, there is a protector card in the diskette slot. This card is inserted at the factory to protect the read/write heads in the drive. To remove it, flip the latch up to pop the card out part way, then pull it out, as shown below.



(If you have a second 5¼-inch diskette drive, be sure to remove the protector card from that drive as well.)

Save the protector card. If you transport your computer, you may want to insert the card into your diskette drive prior to shipping. This will protect the read/write heads during the shipping process.

3 Connecting a Monitor

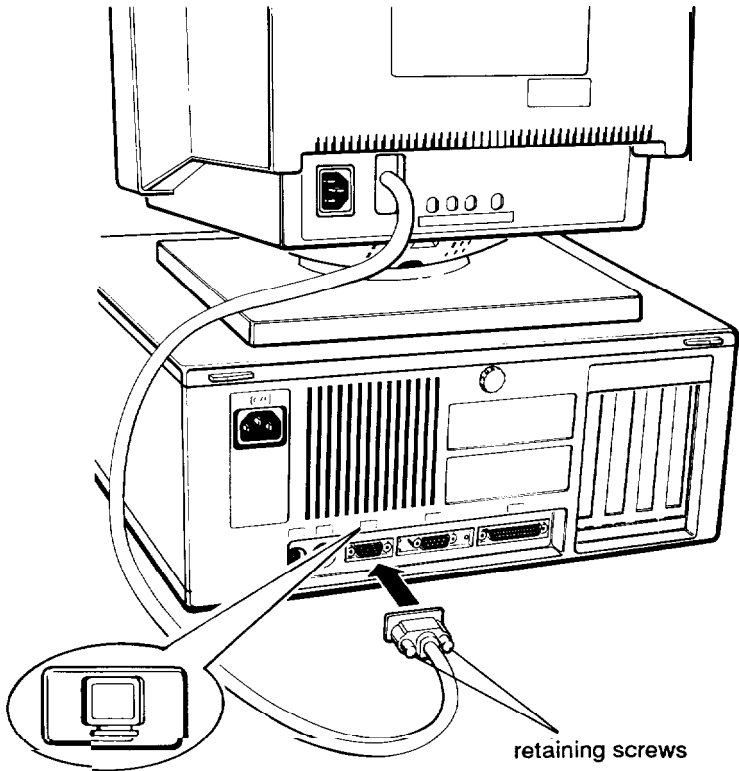
The procedure you use to connect your monitor to the computer depends on the type of monitor you have. If you have a VGA monitor (or a multi-frequency monitor with an analog connector), you can connect it to the computer's built-in VGA port. See "Using the VGA Interface" below. If you have any other type of monitor, see "Using a Display Adapter Card" below.

Using the VGA Interface

Follow these steps to connect your VGA monitor to the VGA port on the computer:

1. Make sure your monitor is turned off.
2. Place your monitor on top of or near the computer. For easy access, turn the monitor and computer around so the backs of both components are facing you.
3. If necessary, connect the monitor cable to the monitor. (Your monitor may have a permanently attached cable.)

4. Examine the connector end of the monitor cable, and position the plug to match the orientation of the monitor interface (marked with a monitor icon). Then insert the plug into the port (the connector should fit in easily when properly oriented), as shown below.

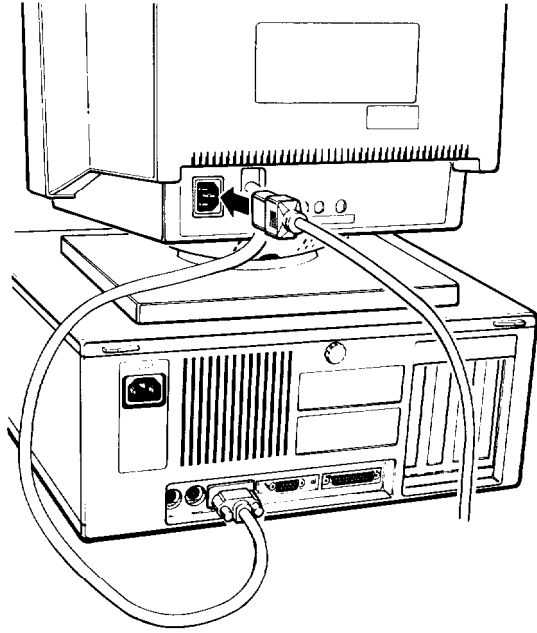


Caution

To avoid damaging the connector, take care not to bend the pins when inserting the plug.

5. If the connector has retaining screws, tighten them by hand or with a screwdriver, depending on the screw type.

6. Plug the monitor power cord into the monitor's power inlet, as shown below.



7. Plug the other end of the power cord into an electrical outlet.

Using a Display Adapter Card

If you are using a non-VGA monitor, you'll need to install a display adapter (video) card in one of the computer's option slots before you can connect the monitor. (Your dealer may have already installed the video card for you.)

If the video card has not yet been installed, you'll need to follow the step-by-step instructions in Chapter 5 to install an option card. But first, check the following table to make sure your display adapter card and monitor are properly matched.

Monitor/video card compatibility

<i>Monitor</i>	Video card
Monochrome	Monochrome display adapter (MDA) Multi-mode graphics adapter (MGA) Enhanced graphics adapter (EGA) Hercules® graphics card
Color or EGA	Color graphics adapter (CGA) Multi-mode graphics adapter (MGA) Enhanced graphics adapter (EGA)

* Color monitors do not support EGA cards.

When you are installing the video card, check to make sure any switches or jumpers on the card are set properly. For example, you may need to change a switch setting to select color or monochrome. See the documentation that came with your monitor or video card for instructions.

Note

If you install an EGA or VGA display adapter card or if you install another type of card that you want to be the primary display adapter, you must set jumper JP14 on the main system board to disable the built-in VGA interface.

If you install one or more cards, you also may need to set jumper JP12 to tell the computer the type of monitor you are using: monochrome or color. If you have two types of cards, set the jumper to indicate which one is your primary monitor type. See Chapter 5 for instructions on changing jumper settings.

Once you have installed your video card, return to this section to connect your monitor to the computer. If your monitor came with its own manual, follow the instructions there. Otherwise, you can follow the steps in “Using the VGA Interface” above; just insert your monitor connector into the video card port instead of the built-in VGA port.

4 Connecting a Printer or Other Device

Your computer has both parallel and serial interfaces. To connect a printer or other peripheral device to one of these interfaces, follow the instructions below. Of course, Epson offers a full range of printers; ask your dealer for more information.

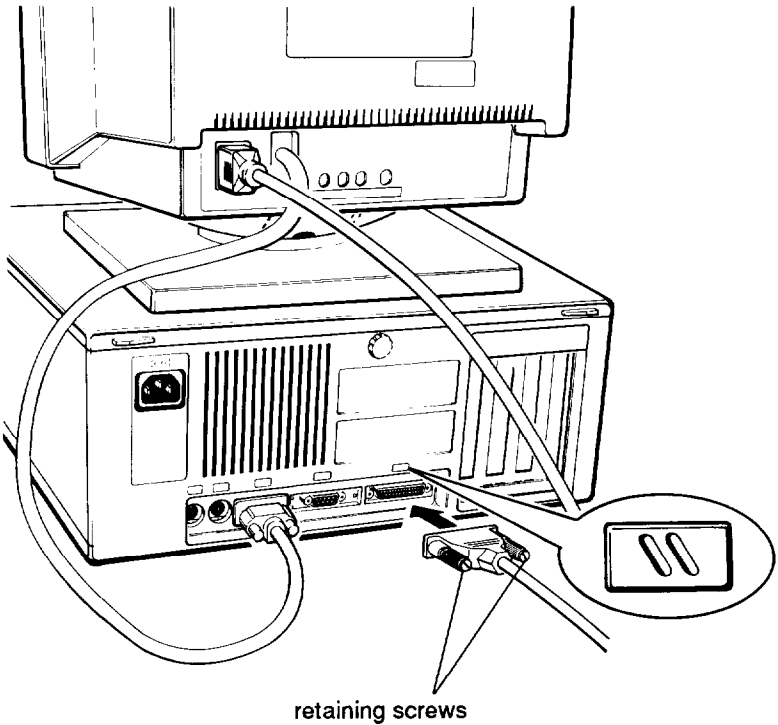
Using the Parallel Interface

The parallel interface on your computer is Centronics® compatible and uses a DB-25S connector.

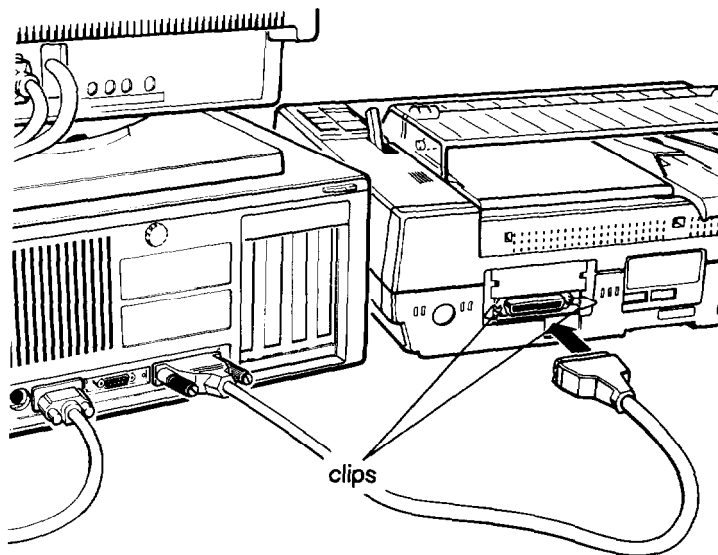
To connect your printer and computer, you need an IBM compatible printer cable. If you are not sure which one you need, check with your Epson dealer.

Once you have the correct printer cable, follow these steps:

1. Place the printer next to the computer with the back panels of both components facing you.
2. One end of the printer cable has a 25pin, D-shell connector. Position the plug to match the orientation of the parallel interface (marked with a special icon). Then insert the connector into the port, as shown below. If the plug has retaining screws, tighten them by hand or with a screwdriver, depending on the screw type.



3. Connect the other end of the cable to the printer, as shown below. To secure the cable, squeeze the clips at each side of the printer port and push them into place.

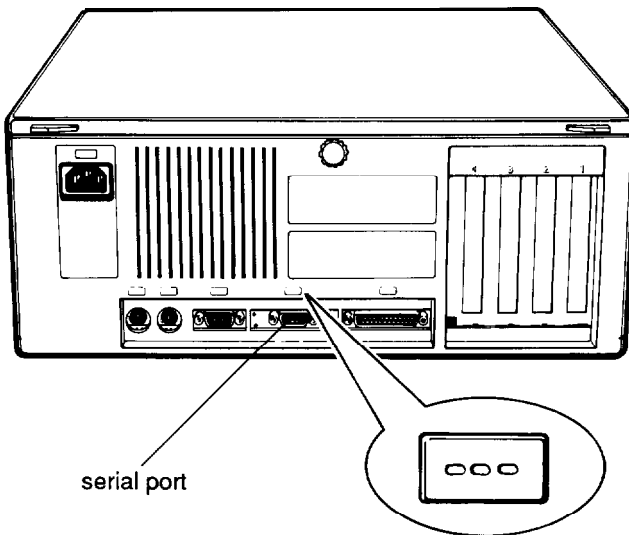


4. Plug the printer's power cord into a three-prong, 120-volt, grounded electrical outlet.

Using the Serial Interface

If you have a printer, a modem, or other peripheral with a serial interface, you can connect it to the serial (RS-232C) port on the back of the computer.

The serial port uses a DB-9P connector, so be sure you have a compatible cable. To connect a serial device, follow the same steps as above for connecting a parallel device but insert the connector into the serial port, marked with a special icon, as shown below.



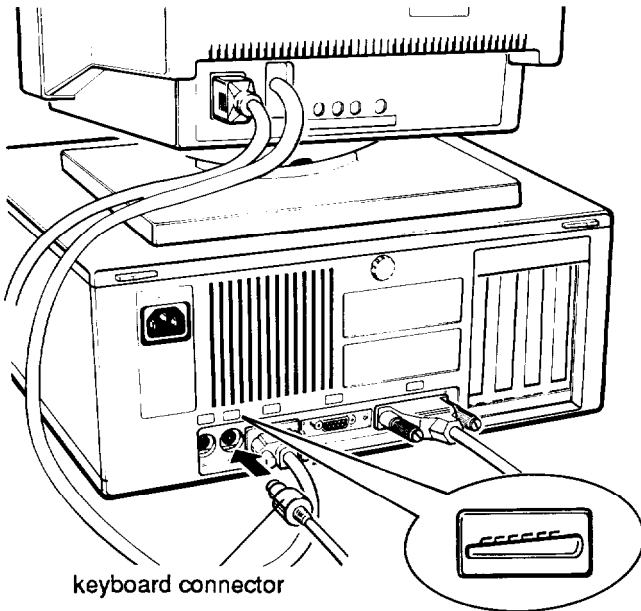
Note

You need to ensure that the serial port is set up so it functions properly. If you are using the port for a serial printer, you need to redirect printer output to the serial port instead of the parallel port. To do this, you can use the MS-DOS `MODE` or `SETMODE` command or the `MENU` utility. See your MS-DOS Reference Manual for instructions.

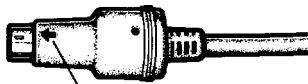
5 Connecting the Keyboard

Follow these steps to connect the keyboard:

1. Hold the keyboard cable connector so the arrow indicator on the housing faces up. Insert the plug into the appropriate socket, marked with a keyboard icon, as shown below.



keyboard connector

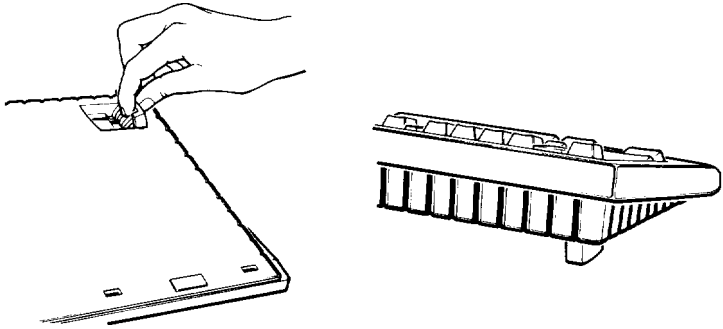


arrow indicator

Caution

Although the keyboard and mouse connectors are physically identical, they cannot be used interchangeably. Be sure to insert the keyboard plug into the keyboard socket.

2. You can raise the keyboard by adjusting the legs on the bottom. To change the angle of the keyboard, turn it over and flip each leg upward until it locks into place, as shown below.

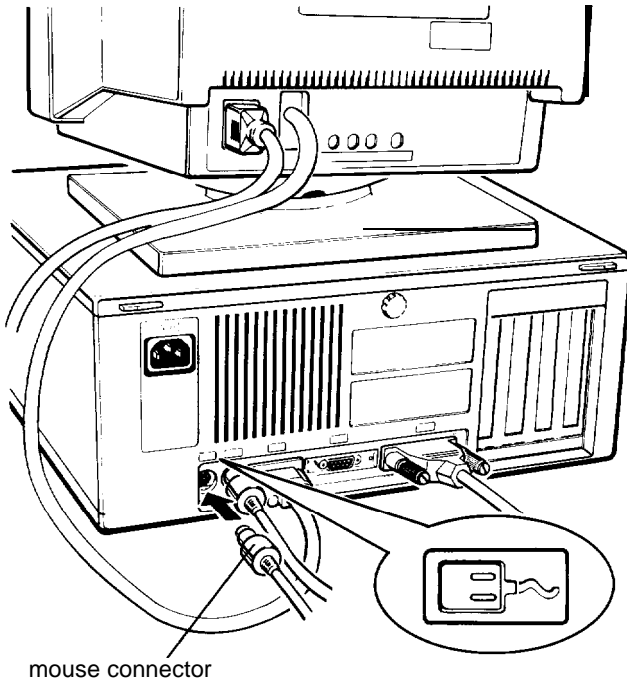


6 Connecting the Mouse

Your computer has an auxiliary port for an IBM PS/2 compatible mouse that uses a miniature DIN (6-pin) connector.

If you have purchased a mouse with this type of connector, you can connect it to the built-in port on your computer. If you have another kind of mouse that requires a different interface port, you need to install an option card to provide the interface. You also need to change the settings of jumpers JP10 and JP11 inside the computer. See Chapter 5 for instructions, or ask your dealer for assistance.

To connect a mouse to the built-in mouse port, hold the mouse plug so it is oriented properly with the computer socket. Insert the plug into the appropriate socket, marked with a mouse icon, as shown in the following illustration.



Caution

Although the mouse and keyboard connectors are physically identical, they cannot be used interchangeably. Be sure to insert the mouse plug into the mouse port.

Once you have connected a mouse, you may need to add commands to your MS-DOS CONFIG.SYS file to enable your computer to use a mouse. See your MS-DOS Reference Manual and the manual that came with your mouse for instructions.

Note

If you want to use a mouse or other pointing device connected to a port on an option card in your computer, you need to change the settings of jumpers JP10 and JP11 inside the computer. See Chapter 5 for instructions.

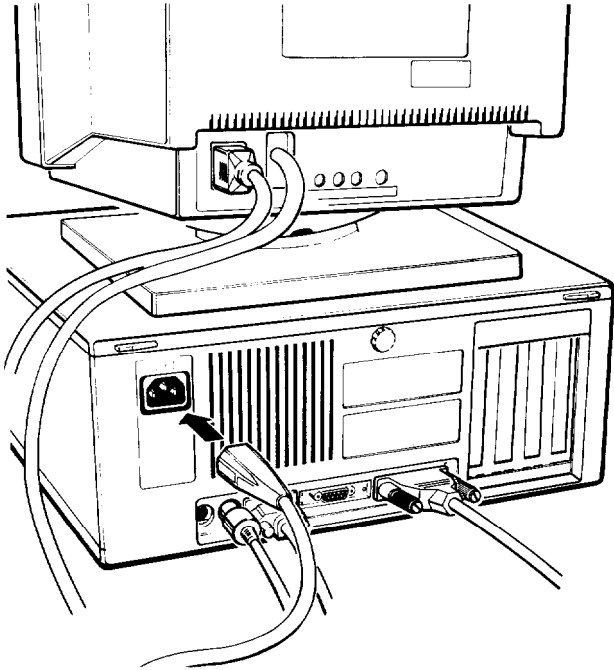
7 Connecting the Power Cord

Follow these steps to connect the power cord:

1. Plug the power cord into the AC power inlet on the back panel, as shown below.

WARNING

To avoid an electric shock, be sure to plug the cord into the computer before plugging it into the wall socket.



2. Plug the other end of the power cord into a three-prong, 120-volt, grounded electrical outlet.

8 Turning On the Computer

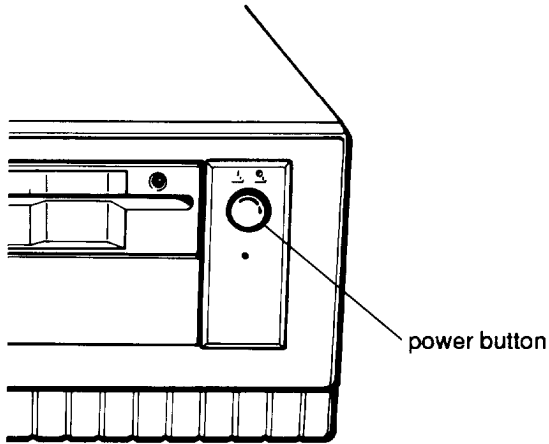
After you set up your system, you're ready to turn on the power. But first, read the following safety rules to avoid accidentally damaging your computer or injuring yourself:

- 0 Do not unplug cables from the computer when the power is on.
- Never turn on the computer with a protector card in the diskette drive.
- Never turn off or reset your computer while a disk drive light is on. This can destroy data stored on disk or make an entire disk unusable.
- Always wait at least five seconds after you turn off the power before you turn it on again. Turning the power off and on rapidly can damage the computer's circuitry.
- Do not leave a beverage on top of or next to your system or any of its components. Spilled liquid can damage the circuitry of your equipment.
- Always turn off the power, disconnect the computer's power cord, and wait five seconds before you remove the cover. Only remove the cover to access optional devices or change jumper settings.

Follow these steps to turn on your system:

1. Make sure the power cord is plugged into the AC power inlet on the back panel of the computer and into a three-prong, 120-volt, grounded electrical outlet.
2. Turn your computer around so the front panel faces you and place your other system components in an arrangement that suits you. (See step 1, "Choosing a Location," for a typical arrangement.)

3. Turn on the monitor, printer, and any other peripheral devices connected to the computer.
4. To turn on the computer, press the power button located on the right side of the front panel, as shown below.



The power indicator below the button lights up. After a few seconds, the computer starts to perform a diagnostic self test—a series of checks it completes each time you turn it on to make sure everything is working correctly.

Note

If you or your dealer have made a major change to your system, such as adding a disk drive, you may need to wait as long as five minutes for your computer to complete power-on diagnostics the first time you turn it on. The more extensive the changes are, the longer the diagnostics take.

When the system has successfully completed its self test, you see a prompt to insert a system diskette. (Do not insert a diskette at this point.)

If necessary, use the controls on your monitor to adjust the brightness and contrast until characters on the screen are clear and at a comfortable level of intensity. If your monitor has horizontal and vertical hold controls, you may need to use them to stabilize the display.

Turning Off the Computer

When you are ready to turn off your system, reverse the sequence of steps you followed to turn it on. Turn off the computer first, then turn off the monitor and any peripherals.

Now go on to Chapter 2 and follow the instructions to run the Setup program.

Chapter 2

Running the Setup Program

The first time you use your Equity 386/25 PLUS, you need to run the Setup program on the Reference diskette to define the computer's configuration. This is a simple procedure you must do at least once. (You may need to do it again later, if you change the configuration.)

The Setup program automatically configures parts of your system and lets you set (or change) the following for your computer:

- Display adapter type
- Power-on password
- Extended memory caching
- Processor speed
- Keyboard and speaker options
- Real-time clock's time and date
- Hard disk drive configuration
- Diskette drive type(s)
- Serial and parallel port settings.

The configuration you define with the Setup program is stored in the computer's CMOS RAM, which is backed up by a battery. Whenever you turn on the computer, it searches the CMOS RAM for the correct installation information. If the computer discovers a difference between the information in the CMOS RAM and its actual configuration, it prompts you to run the Setup program.

Automatic Configuration

The Equity 386/25 PLUS automatically defines your system's memory configuration and recognizes a math coprocessor, if you have installed one. It also detects and configures most of the devices you have installed in your system. For this reason, you may not need to change any of the default settings in the Setup program. However, you should check each of the options on the Setup menu to verify that the settings are correct for your configuration.

The computer automatically configures the 2MB of memory that comes with your system as 640KB of base memory and 1024KB of extended memory. If you install even more memory, Setup configures it as extended memory also.

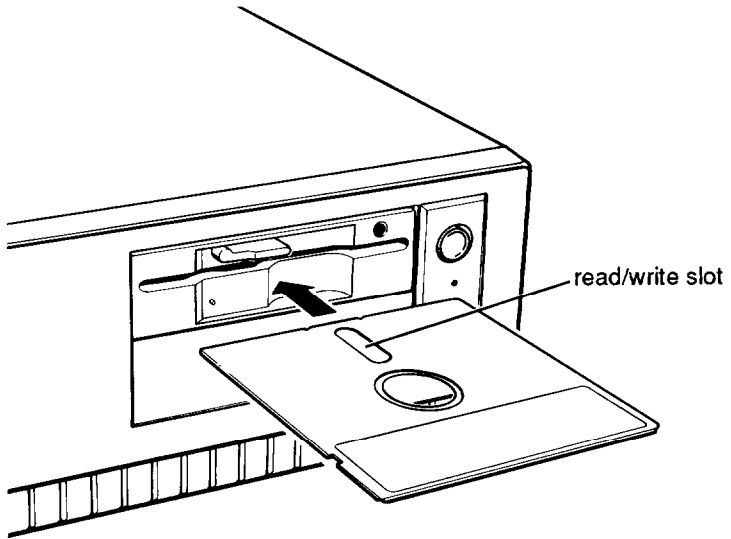
Note

To run certain application programs, you may need to reduce the amount of base memory from 640KB to 512KB or 256KB. Check the documentation that came with your software to see if this is necessary. If you do need to change the amount of base memory, you must set jumpers on the main system board inside your computer. See "Changing the Jumper Settings" in Chapter 5 for instructions.

Starting the Setup Program

Follow these steps to start the Setup program:

1. Make sure your computer is turned off.
2. Insert the Reference diskette in drive A as shown in the following illustration. Make sure the label is facing up and the read/write slot is pointed toward the drive.



Slide the diskette into the drive until it is in all the way. Then turn the latch down to lock it in a vertical position. (For more instructions on inserting and removing diskettes, including 3½-inch diskettes, see Chapter 3.)

3. Turn on your system. (Remember to turn on your monitor and any peripherals before you turn on the computer.) The screen displays the Operation Menu:

```
OPERATION MENU

1 - Setup
2 - Format hard disk
3 - System diagnostics
4 - Prepare hard disk for moving
0 - Exit to DOS for more utilities
```

If an error message appears when you turn on the computer, see “Continuing From an Error Message,” below.

4. The Setup option is highlighted. To select it, press **Enter**. The screen displays the main Setup menu:

```
Exit
Display
Password
Cache memory
Processor speed
Keyboard / Sound
Real-time clock
Hard disk drive
Diskette drive
Serial/Parallel
```

Continuing From an Error Message

If your computer has never been set up, you may see an error message, such as the following:

```
162 - System options not set
      (Run SETUP in REFERENCE DISK)
```

(Resume = "F1" key)

If you see an error message like this one, follow these steps:

1. Press **F1**. The computer beeps and the screen displays a message, such as the following:

```
Error(s) detected
◆ Incorrect configuration
Set default value ? ( Y / N )
```

The error message beside the diamond indicates the condition causing the error. There may be more than one error listed in the message. Here are some of the error messages you may see:

```
Time is invalid
HDD and/or HDC failed initialization
Memory size is incorrect, correction made
Cacheable range is adjusted
Incorrect configuration
Checksum is incorrect
HDD is incorrect
```

Some errors, such as `Time is invalid`, do not allow you to set a default value, so the screen does not display the Set default value prompt. If you see one of these errors, press `ESC`; the screen displays the main Setup menu so you can enter a new setting.

2. Be sure `Y` is highlighted and press `Enter`. The Setup program changes the setting that caused the error to a setting that is more likely to match your configuration. The screen displays the main Setup menu:

```
Exit
Display
Password
Cache memory
Processor speed
Keyboard / Sound
Real-time clock
Hard disk drive
Diskette drive
Serial/Parallel
```

You should check all the settings in the Setup program to make sure they are correct for your system. The default value for the setting that caused the error may not be the correct one for your configuration.

Note

If you choose **N** or press **ESC** instead of selecting **Y** to set a default value, the Setup program does not change the setting that caused the error and the screen displays the main Setup menu. Be sure to correct this setting before you exit Setup.

Moving the Cursor Block

Use **↓** and **↑** to move the cursor block (the highlighted bar) through the options on the main Setup menu. After you highlight the option you want, press **Enter** to select it.

Note

If the arrow keys on the numeric keypad do not appear to work, num lock mode may be enabled (turned on). If the Num Lock indicator in the upper right corner of the keyboard is lit, press **Num Lock** once to turn it off and enable the arrow keys on the numeric keypad. If you need to enter numbers while using the Setup program and you want to use the numeric keypad, press **Num Lock** to turn it back on.

Follow the instructions in the rest of this chapter to use the Setup program to define your computer's configuration.

Setting the Display Adapter Type

The Setup program can usually detect the exact type of display adapter you are using with your computer. If you have connected a VGA monitor to the built-in VGA port, the Setup program automatically sets the display adapter type. (With this option you select the type of display adapter you are using-not the type of monitor.) If you have installed a display adapter card-or you just want to check the display adapter setting-follow these steps.

Note

If you have installed an EGA or VGA display adapter card, or another type of card that you want to be the primary display adapter, you must set jumper JP14 on the main system board to disable the built-in VGA interface.

If you have installed one or more video cards, you also may need to set jumper JP12 to tell the computer the type of monitor you are using: either monochrome or color. If you have two types of cards, set the jumper to indicate which one is your primary monitor type. See Chapter 5 for instructions on changing jumper settings.

1. At the main Setup menu, highlight Display. A submenu appears identifying the current display adapter type, such as the following:

VGA

If the display adapter type is correct for your system, you can skip this section.

2. To change the display adapter setting, press **Enter**. The cursor block moves into the submenu and you see an additional menu on the right side:

CGA	40 column
CGA	80 column
Monochrome	80 column
EGA, MCGA, VGA	or other

3. Press **Enter** to move the cursor block into this submenu and then use **↑** or **↓** to highlight the option that matches your display adapter type. If you are not sure which one to choose, follow these guidelines:

- If you are using the built-in VGA adapter or have installed a VGA, EGA, or MCGA card, select EGA, MCGA, VGA or other.
- If you have a color graphics adapter (CGA) or a multi-mode graphics adapter (MGA) attached to an RGB (color) monitor, select CGA 80 column. (Also set the color/mono switch on the MGA card to color.)
- If you have a composite color monitor, such as a color television with a video input, try selecting CGA 80 column. If the resulting resolution is poor, run Setup again and select CGA 40 column.
- If you have a monochrome display adapter (MDA), an MGA, or a Hercules MGA attached to a monochrome monitor, choose Monochrome 80 column. (Also set the color/mono switch on the MGA card to mono.)
- If you have any other combination of monitor and display adapter card, select EGA, MCGA, VGA or other. In addition, consult the documentation supplied with your display adapter card.


Note

If you have two display adapters of different types, select the setting for the one you want to be your primary display adapter. The other one is your secondary adapter. A message appears at power-on telling you whether you are currently using your primary or secondary adapter.

4. After you highlight the appropriate display adapter type, press **Enter**. The screen displays your new setting.
5. Highlight *** * * SAVE SETTING * * *** and press **Enter** to return to the main Setup menu.

Setting the Power-on Password

A power-on password is a feature that lets you control who can access your system. However, you do not need to set a power-on password to use your computer. If you do not want to set a password, skip this section.

Once you set a power-on password, you must enter it at the key prompt () every time you turn on or reset your computer. If you cannot enter it correctly, the computer does not respond to your keyboard entries. Therefore, if you set a power-on password, be sure to remember it or write it down and keep it in a safe place.

If you want to use your computer as a network server, you can set your password to operate in network server mode. (See “Using Your Computer as a Network Server” in Chapter 4 for more information.)

Follow these steps to set a power-on password and turn on network server mode (if necessary):

1. At the main Setup menu, highlight **Password**. This submenu appears:

```
Power-on password
Network server mode OFF
```

2. Press **Enter**. The cursor block moves to power-on password.
3. Press **Enter**. The cursor block moves to an empty box:

```
_____
```

Note

If a password already exists, this message appears:

```
Power-on password already installed
```

The Setup program does not allow you to enter a new password if you have already set one. However, you can easily change or delete the current password if you know it. See "Using a Power-on Password" in Chapter 3 for instructions.

4. To enter a password, type any combination of characters (including letters, numbers, and blank spaces) up to a total of seven characters. You can use the backspace key to delete mistakes.

Do not use characters requiring the **Shift** key, such as \$, @, or * in your password. The computer does not recognize the **Shift** key when you use your password to access the system.

Caution

Be sure to remember the password you enter or write it down and keep it in a safe place. If you cannot remember your password, you will not be able to access the computer the next time you turn it on.

If you want to return to the password submenu without saving any changes, press Esc.

5. After you enter a password, press **Enter** to return to the password submenu.
6. If you want to change the network server mode setting, highlight **Network server mode** . To turn network server mode on or off, press **Enter**.

You must set a power-on password to turn on network server mode. If you did not yet enter a password, this message appears:

```
Set a power-on password first
```

To enter a password, highlight **Power-on password** and follow steps 3 through 5 above.

7. After you enter a power-on password and turn network server mode on or off, highlight *** * * * SAVE SETTINGS * * * *** and press **Enter** to return to the main Setup menu.

Note

If you forget your password, there is a way to disable the password function. See "Password Problems" in Appendix D for instructions.

Setting the Extended Memory Caching

Extended memory caching allows your system to work much faster. When you cache portions of memory, the computer copies information from that memory into a high-speed cache buffer. Your system can find information more quickly in the cache buffer than when it looks for it in the system memory. This greatly improves the speed at which your system performs.

Note

Caching is active only when your computer is operating at 25 MHz (high) speed.

The Equity 386/25 PLUS automatically enables memory caching for the 640KB of base memory in your system. For the memory above 1MB, the Setup program allows you to turn extended memory caching on or off. The default setting is ON for all the extended memory currently installed in your system from 1MB up to the maximum.

Most of the time, you should cache all of your extended memory to maximize the performance of your 32-bit computer. However, if you install an optional memory card that “shares” memory with any of your other system memory, you should turn caching off in memory areas that are shared. See the manual that came with your memory card to see if this is necessary.

To check or change the extended memory cache setting, follow these steps:

1. At the main Setup menu, highlight Cache memory. You see the following cache memory table:

Extended memory caching															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15MB+
Base	On														

The table indicates the range of extended memory currently installed in your system. You see ON or OFF in the first area because your system comes with 2MB of memory and the extended memory area from 1MB to 2MB can be cached. If you installed additional memory, you see ON or OFF for each additional megabyte of memory you have installed. The shaded areas indicate ranges of memory that are not installed.

If your extended memory cache setting is correct, you can skip the rest of this section.

2. To change the setting, press **Enter**. The cursor block moves to **Extended memory caching**.
3. Press **Enter** again. The cursor block moves to the first range in the cache table. To change the setting for the first range from ON to OFF or vice versa, press **Enter**.
4. If you installed memory above 2MB, press **→** to move the cursor block to the next range. Press **Enter** to change the setting from ON to OFF, if necessary.

Then press **→** or **←** to move to the other ranges and press **Enter**, as necessary, to change the settings.

5. When you are finished, press **↑** to move the cursor block to the submenu.
6. Highlight * * * **SAVE SETTING** * * * and press **Enter** to return to the Setup menu.

Setting the Processor Speed

Your computer's processor can operate at two speeds: high or low. High speed is 25 MHz and low speed simulates 8 MHz. The processor is set to operate at high speed (where it can access memory faster) unless you change it to low or set the speed to change automatically (when necessary).

When the computer is running at high speed, the **TURBO** indicator on the front panel is illuminated.

You should use high speed for almost everything you do since your programs work faster on high speed. However, certain application programs have specific timing requirements for diskette access and can run only at a slower speed; check your application program manual.

When you set the processor to change speed automatically, the computer switches to low whenever it needs to access a diskette drive and runs at high for all other operations.

Note

You may not want to use the automatic setting for certain copy-protected programs. See "Changing the Processor Speed" in Chapter 4 for more information.

This section describes how to set the processor speed in the Setup program. You can also change the speed using keyboard commands or by running the ESPEED program. See "Changing the Processor Speed" in Chapter 4 for more details.

Follow these steps to set your processor speed:

1. At the main Setup menu, highlight **Processor speed** . The current status appears:

Speed: High

If the displayed setting is correct, skip this section,

2. To change the processor speed, press **Enter**. The cursor moves into the submenu and you see another menu:

```
High
Automatic
Low
```

(High is 25 MHz, Low simulates 8 MHz, and Automatic tells the computer to switch from high to low when accessing a diskette drive.)

3. Press **Enter** to move the cursor block into the option menu.
4. Use **↑** or **↓** to highlight the speed you want and press **Enter**.
5. Highlight **** SAVE SETTING **** and press **Enter** to return to the main Setup menu.

Setting the Keyboard and Speaker Options

The Keyboard/Sound option lets you control these three features in your computer:

- Speaker
- Initial num lock mode
- Keyboard repeat rate.

Your computer has a built-in speaker that beeps when you perform certain operations. The default setting is Enabled (on) since it serves a useful purpose in many applications; however, you may prefer to disable the speaker.

When num lock mode is on, you can use the numeric keys on the keypad to enter numbers. The initial num lock option in the Setup program determines whether num lock is on or off when you turn on your computer.

To turn num lock mode off, just press **Num Lock**. The **Num Lock** light (on the keyboard) goes out and num lock is disabled until you turn the computer off or until you press **Num Lock** again. The next time you turn on your computer, num lock returns to the setting you selected in the Setup program.

Note

If you are using the keyboard that came with your computer (or another IBM AT compatible keyboard), the default for the initial num lock setting is ON. If you are using a keyboard that has 83 or 84 keys, the initial num lock default setting is OFF.

The keyboard repeat rate option lets you change the speed at which your keyboard repeats a character when you hold down a key. The default setting is *Normal*, but you can make the rate faster or slower.

Follow these steps to check or change the keyboard and speaker options:

1. At the main Setup menu, highlight *Keyboard/ Sound*. The current settings appear:

Speaker	Enabled
Initial num lock	ON
KB repeat rate	Normal

If the displayed settings are appropriate for you, skip this section.

2. To change any of the settings, press **Enter**. The cursor block moves into the submenu and the `Speaker` option is highlighted.
3. To enable or disable the speaker (turn it on or off), press **Enter**.
4. To turn the initial num lock setting on or off, highlight `Initial num lock` and press **Enter**.
5. To change the keyboard repeat rate, highlight `KB repeat rate`. You see the following option menu:

```
Slow
Normal
Fast
```

6. Press **Enter** to move the cursor block into the menu.
7. Use **↑** or **↓** to highlight the speed you want and press **Enter**.
8. Highlight `*** SAVE SETTINGS * * *` and press **Enter** to return to the main Setup menu.

Setting the Real-time Clock

The real-time clock in your computer continuously tracks the time and date—even when the computer is turned off. The first time you run Setup, use the `Real-time clock` option to set the time and date for your computer. You may need to use this option again later to adjust your clock for daylight savings time. The computer automatically changes the date for leap years.

Note

Another way to change the real-time clock's time and date is with the MS-DOS TIME and DATE commands. See your MS-DOS Reference Manual for instructions.

Follow these steps to set the real-time clock:

1. At the main menu, highlight Real-time clock. If the time and date have been previously set, the current settings appear:

Time	09:16:52
Date	12-29-1990

If the time and date are correct, you can skip the rest of this section.

If the time and date are incorrect, go to step 2 below.

If the time and date have never been set, the submenu contains a template for you to fill in:

Time	xx:xx:xx
Date	xx-xx-xxxx

2. Press **Enter** to move the cursor block into the submenu.
3. To set or change the time, press **Enter** again. You see this box:

hh:mm:ss
—

(“hh” stands for hours, “mm” stands for minutes, and “ss” stands for seconds.)

- Using a 24-hour clock, enter the time in the exact format shown in the box. Type two digits for each part; the Setup program automatically inserts the colons (:). For example, to set the time to 1:30 p.m., you would type the following:

133000

You can use the backspace key to make corrections. When the time is correct, press **Enter**. If you enter an invalid time—for example, a number greater than 23 for the hours or greater than 59 for the minutes or seconds—the computer ignores your entry. Try again.

- To set or change the date, highlight `Date` and press **Enter**. You see this box:

mm-dd-yyyy
—

(“mm” stands for month, “dd” stands for day, and “yyyy” stands for year.)

- Enter the date in the exact format shown in the box. Use two digits for the month and day, and four digits for the year; the Setup program automatically inserts the hyphens. For example, to set the date for December 29, 1990, you would type the following:

12291990

You can use the backspace key to make corrections. When the date is correct, press **Enter**. If you enter an invalid date—for example, a number greater than 12 for the month or greater than the number of days in that month—the computer ignores your entry. Try again.

- Press **↑** once or twice to return to the main Setup menu.

Note

The Setup program automatically saves the time and date when you press **Enter** after typing each one. If you then exit the Setup program without saving your changes, the new time and date still take effect.

Setting the Hard Disk Drive Configuration

If your computer came with a factory-installed hard disk, your hard disk configuration has already been set and you can skip this section.

If you installed or removed a hard disk, follow these steps to set the computer's hard disk configuration:

1. At the main menu, highlight **Hard disk drive**.
Your current settings appear, such as the following:

Drive 1:	Type	60
Drive 2:	None	

The **Type** number indicates the type of hard disk installed in your computer. See your hard disk documentation for the correct drive type number. (If that documentation does not give the drive type number, it may list the drive's parameters which you can use to identify the drive type number.) Then consult the **Hard Disk Drive Types** table on page 2-24 for a list of the types you can use in your computer.

The **None** after **Drive 2** indicates that there is no second hard disk.

If the displayed settings match your hard disk configuration, skip the rest of this section.

If a setting is incorrect, or if you want to see more details about your hard disk configuration, go to step 2.

2. Press **Enter**. You see a menu such as the following:

Change settings ** SAVE SETTINGS **	
Drive 1: Type 60	Drive 2: None
Number of cylinders 776	Number of cylinders 0
Number of heads 8	Number of heads 0
Number of sectors 33	Number of sectors 0
Precomp. cylinder None	Precomp. cylinder 0
Landing zone 775	Landing zone 0
Total capacity (MB) 100	Total capacity (MB) .0

The submenu lists the settings you can change for each drive: the number of cylinders, the number of read/write heads, the number of sectors, the precompensation cylinder, and the landing zone (the cylinder on which you park the heads when moving the computer). It also displays the total storage capacity in megabytes.

3. If you want to change the settings for drive 1 (which is drive C on most computers), press **Enter** to highlight **Drive 1:**. If you want to change the settings for drive 2, press **Enter** and then **→** to highlight **Drive 2:**.
4. Press **Enter** again. You see this submenu:

None
Type 60
User defined

5. If you have disconnected the drive or if the drive does not exist, highlight `None` and press **Enter**. All the drive settings become 0. Go to step 8.

If your hard disk matches one of the drive types listed in the Hard Disk Drive Types table, go to step 6.

If your hard disk does not match one of the drive types listed in the Hard Disk Drive Types table, go to step 7.

6. Highlight `Type` and press **Enter**. The current type number appears:

Type 60

Now select the drive type number that matches your hard disk configuration in the Hard Disk Drive Types table.

You can enter the drive type in one of two ways:

- You can type the drive type number and press **Enter**. The screen displays the new number and settings.
- You can use the cursor keys to scan through the drive type numbers. This is a handy way to verify new hard disk settings before you press **Enter** because the settings list is updated as you display each new type.

After you select the appropriate drive type number, press **Enter**. The screen displays the new number and hard disk settings. Go to step 8.

7. If the configuration of the hard disk does not match one of the drive types listed in the Hard Disk Drive Types table, highlight `User defined` and press **Enter**. You see the following:

Number of cylinders 776

The same parameter is highlighted on the submenu above. Enter the correct number of cylinders and press **Enter**.

The information for `Number of cylinders` is automatically updated on the submenu above and you see the next parameter, `Number of heads`. Enter the correct number of read/write heads for the hard disk and press **Enter**.

Follow this same procedure for each remaining item in the settings list (the number of sectors, the precompensation cylinder, and the landing zone).

If you enter a parameter incorrectly, press **↑** or **↓** to highlight the parameter and then enter it again.

The Setup program does not allow you to enter the total storage capacity; it calculates the storage capacity for you based on what you enter for the number of cylinders, heads, and sectors.

After you type the landing zone number and press **Enter**, the cursor block returns to the Drive submenu heading.

8. If you want to change the hard disk type for another drive, press **→** or **←** and return to step 4.
9. When the hard disk drive settings are correct, press **↑** to move the cursor block into the top submenu. Highlight **** SAVE SETTINGS **** and press **Enter** to save your hard disk drive configuration.

Hard Disk Drive Types

The following table lists the types of hard disk drives you can use in your computer. Check this table and the documentation supplied with your hard disk to find the correct number for the type of hard disk drive(s) installed in your computer. You need to enter this number when you set the hard disk drive configuration in the Setup program.

Hard disk drive type

Type no.	Type	Cylinders	Heads	Sectors	Precomp	Landing zone	MB	Drive name
00								No fixed disk
01	ST-506	306	4	17	128	305	10.2	(Used by ESDI)
02	ST-506	615	4	17	300	615	20.4	(1)
03	ST-506	615	6	17	300	615	30.6	
04	ST-506	940	8	17	512	940	62.4	
05	ST-506	940	6	17	512	940	46.8	
06	ST-506	615	4	17	—	615	20.4	
07	ST-506	462	8	17	256	511	30.7	
08	ST-506	733	5	17	—	733	30.4	
09	ST-506	900	15	17	—	901	112.1	
10	ST-506	820	3	17	—	820	20.4	
11	ST-506	855	5	17	—	855	35.5	
12	ST-506	855	7	17	—	855	49.7	
13	ST-506	306	8	17	128	319	20.3	
14	ST-506	733	7	17	—	733	42.6	
15								—reserved—
16	ST-506	612	4	17	0	663	20.3	
17	ST-506	977	5	17	300	977	40.5	CDC 94205-51 (2)
18	ST-506	977	7	17	—	977	56.8	
19	ST-506	1024	7	17	512	1023	59.5	
20	ST-506	733	5	17	300	732	30.4	Toshiba MK-133FA
21	ST-506	733	7	17	300	732	42.6	Toshiba MK-134FA
22	ST-506	733	5	17	300	733	30.4	
23	ST-506	306	4	17	0	336	10.2	
24	ST-506	612	4	17	305	663	20.4	
25	ST-506	306	4	17	—	340	10.2	
26	ST-506	612	4	17	—	670	20.4	
27	ST-506	698	7	17	300	732	40.6	
28	ST-506	976	5	17	488	977	40.5	
29	ST-506	306	4	17	0	340	10.2	

Hard disk drive types (continued)

Type no.	Type	Cylinders	Heads	Sectors	Precomp	Landing zone	MB	Drive name
30	ST-506	611	4	17	306	663	20.4	
31	ST-506	732	7	17	300	732	42.6	
32	ST-506	1023	5	17	—	1023	42.5	
33-40								none
41	ESDI	1022	5	34	—	1022	84.8	CDC 94216-106 (3)
42	ESDI	1022	5	36	—	1022	89.8	CDC 94216-106
43	ST-506	1024	8	17	512	1023	68.0	(4)
44	ESDI	828	10	34	—	828	137.5	Toshiba MK-156F
45	ST-506	1024	5	17	512	1023	42.5	(5)
46	ST-506	615	8	17	128	618	40.8	NEC D5147H
47								none
48	ST-506	820	6	17	—	820	40.8	Seagate ST251
49	ST-506	830	10	17	—	830	68.9	Toshiba MK56FB
50	ST-506	1024	9	17	—	1023	76.5	Seagate ST4096
51	ESDI	828	7	34	—	828	96.2	Toshiba MK-154F
52	ESDI	967	5	36	—	967	85.0	CDC 94166-101
53	ESDI	967	7	36	—	967	119.0	CDC 94166-141
54	ESDI	967	9	36	—	967	153.0	CDC 94166-182
55	ESDI	1022	7	34	—	1022	118.8	Micropolis 1354A
56	ESDI	967	5	34	—	967	80.3	CDC 94166-101 (3)
57	ESDI	967	7	34	—	967	112.4	CDC 94166-141 (3)
58	ESDI	967	9	34	—	967	144.5	CDC 94166-182 (3)
59	AT	980	5	17	—	979	40.7	Conner CP-344
60	AT	776	8	33	—	775	100	Conner CP-3104
61	AT	745	4	28	—	744	40.5	Mini 8051A native mode
62	AT	965	5	17	—	Auto	40	Quantum 40AT (6)
63	AT	965	10	17	—	Auto	80	Quantum pro 80AT (6)
64-255								none

Notes:

1. Miniscribe 8425F, Seagate ST125
2. Conner CP-3044 or Miniscribe 8051A can be used as type 17
3. For Western Digital ESDI HDC or Drive Maker default selling
4. Micropolis 1325, Alaal 3085, Lanstor Lan64, Maxtor XT1085, Newbury NDR1085
5. Micropolis 1323A
6. The landing zone
The factory-installed

60 (100MB).

Setting the Diskette Drive Type(s)

Your Equity 386/25 PLUS probably came with one factory-installed diskette drive. If you added a second diskette drive or removed one, you may need to change the diskette drive settings to match your configuration. If you haven't made any changes, you can verify your drive type settings. Follow these steps:

1. At the main menu, highlight `Diskette drive`. The current settings appear:

Drive A:	1.2 MB
Drive B:	None

If the diskette drive types on the screen match your diskette drive configuration, you can skip the rest of this section.

2. To change a setting, press **Enter**. The cursor block moves into the diskette drive submenu and you see the following:

Not installed
360 KB drive
720 KB drive (3.5")
1.2 MB drive
1.44 MB drive (3.5")

You also see the message `Selected drive light is ON`. This tells you that the light on the diskette drive currently selected is on.

3. If you want to change the drive A settings, be sure `Drive A:` is highlighted and press **Enter**. If you want to change the drive B settings, highlight `Drive B :` and press **Enter**. The cursor block moves into the submenu.

4. Use ↓ or ↑ to highlight the correct capacity for your diskette drive and press **Enter**. The screen displays the type you selected.

If you want to enter the type for another diskette drive, return to step 3.

5. When the diskette drive settings are correct, highlight ** SAVE SETTINGS ** and press **Enter**. The cursor block returns to the main Setup menu and you see the updated information for drives A and B.

Setting the Serial/Parallel Interfaces

The serial and parallel interfaces in your computer are set to act as the primary ports. If you have not added any additional serial or parallel port, you can skip this section.

If you install an option card with its own serial or parallel port, you may want to designate the built-in port as secondary and the additional port as primary. The Setup program lets you choose which port is primary and which is secondary so there is no conflict between the built-in port and the additional port. Here are some guidelines:

- If you install an option card with a port preset as primary by the manufacturer, you must designate it as the primary port and make the computer's built-in port the secondary port.
- If you install an option card or peripheral with a port that is not pre-set, you can designate it as the primary or secondary port.
- If you install two option cards with ports, designate one as the primary port and the other as the secondary port and disable the built-in port.

Follow these steps to change your built-in serial and parallel interface settings:

1. At the main menu, highlight `Serial/Parallel`. The current settings for each port appear:

Serial	Primary
Parallel	Primary

2. Press **Enter** to move the cursor block into the submenu. You see this additional option menu:

Disabled
Primary
Secondary

3. If you want to change the serial port setting, be sure `Serial` is highlighted and press **Enter**. If you want to change the parallel port setting, highlight `parallel` and press **Enter**. The cursor block moves into the submenu.
4. Use **↓** or **↑** to highlight the appropriate setting for the port you selected and press **Enter**. The screen displays the new setting.

Note

If you add an option card with a parallel or serial port and highlight a setting that causes a conflict between your built-in port and the port on the option card, you see this message:

Conflict with option card

Highlight a setting that is appropriate for your system configuration and press **Enter**.

If you want to change the setting for the other port, return to step 3.

- When the serial and parallel port settings are correct, highlight **** * SAVE SETTINGS ***** and press **Enter**. The cursor block returns to the main Setup menu and you see your updated serial and parallel interface settings.

Reviewing Your Settings

When you finish using the Setup program to define your computer's configuration, use **↑** to highlight **Exit** at the main Setup menu and press **Enter**. The following Setup summary appears on the screen:

Cache	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15MB+
Cache	On														
Memory	Base memory	640 KB													
	Extended memory	1024 KB													
Password	Power-on password	not installed													
	Network server mode	OFF													
Display type	Detected VGA	EGA, MCGA, VGA or other													
Processor speed		High													
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Change settings Exit without saving ** EXIT AND SAVE **</div>															

There are two more Setup summary screens you need to check. To display the next screen, press **PgDn**. You see the following:

Real-time clock	Time	13:40:38
	Date	12-29-1990
coprocessor		not installed
Diskette drive	Drive A:	1.2 MB
	Drive B:	None
Speaker		Enabled
Initial num lock		ON
Keyboard repeat rate		Normal
Serial		Primary
Parallel		Primary

Change settings
Exit without saving
** EXIT AND SAVE **

If you have never set the real-time clock, the entry at the top of the screen flashes to remind you to set the time and date. See “Setting the Real-time Clock,” above, for instructions.

To view the last Setup summary screen, press **PgDn**. You see your hard disk drive configuration(s):

Hard disk drive			
Drive 1: Type 60		Drive 2: None	
Number of cylinders	716	Number of cylinders	0
Number of heads	8	Number of heads	0
Number of sectors	33	Number of sectors	0
Precomp. cylinder	None	Precomp. cylinder	0
Landing zone	775	Landing zone	0
Total capacity (MB)	100	Total capacity (MB)	.0

Change settings
Exit without saving
** EXIT AND SAVE **

Check each Setup summary screen to see if all the information is correct. You can press **PgUp** to display the previous screen or **PgDn** to display the next screen. If anything is incorrect, be sure **Change settings** is highlighted and press **Enter**. The main Setup menu appears and you can change the appropriate settings.

Leaving the Setup Menu

If you did not change any settings or you want to cancel the changes you made, highlight **Exit** without saving at a Setup summary screen and press **Enter**. The Operation Menu appears. (If you changed the time or date, the new setting takes effect even if you exit the Setup program without saving your changes.)

If you want to save the settings you entered, highlight **** EXIT AND SAVE **** and press **Enter** at a Setup summary screen. The Setup program stores the new settings and resets the computer using the new configuration. If you have set a password, you need to enter it at the key prompt. (See “Using a Power-on Password” in Chapter 3 for instructions.) The Operation Menu appears.

If you have just run Setup for the first time, remove the Reference diskette from the drive and turn off your system. Then follow the instructions in your MS-DOS Installation Guide to install MS-DOS. (If you are using a different operating system, follow the installation instructions in that manual.)

Once you have installed MS-DOS, you should always boot the computer from the hard disk or the MS-DOS Startup diskette when you are finished running Setup. First remove the Reference diskette from drive A. If you do not have a hard disk, insert the Startup diskette. Then reset your computer to make sure it performs all the commands in the **CONFIG.SYS** and **AUTOEXEC.BAT** files.

If the computer displays an error message while it is starting up, run the Setup program again and check the setting the error message indicates. If the computer still displays an error message after you check your Setup program settings, see Appendix D or E, or ask your dealer for assistance.

Note

Be sure to make a backup copy of your Reference diskette after you run the Setup program and install MS-DOS. See your MS-DOS Reference Manual for instructions on how to copy diskettes.

Chapter 3

Using Your Computer

This chapter briefly describes the following procedures for using your computer:

- Installing MS-DOS or another operating system
- Copying the Reference and Utility diskette files
- Using special keys on the keyboard
- Stopping a command or program
- Resetting the computer
- Using a power-on password
- Using disks and disk drives.

Installing MS-DOS or Another Operating System

After you connect the components of your system and run the Setup program, you must install the operating system on your computer. If you are installing MS-DOS, follow the instructions in your MS-DOS Installation Guide. If you are installing another operating system, such as MS OS/2 or UNIX, see the manual that comes with that system for instructions on installing and using it. The instructions in this manual assume that you are using MS-DOS with your computer.

Note

Be sure to make backup copies of your original operating system diskettes.

Copying the Reference and Utility Files

If you have a hard disk, you'll probably want to copy some of the files on your Reference and Utility diskettes to the hard disk. This allows you to run the programs directly from your hard disk instead of having to insert a diskette. Use the COPY command (described in your MS-DOS Reference Manual) to copy the following files from the Reference diskette to your hard disk:

```
AFDD.EXE      ESPEED.EXE    HDSIT.COM  
HDSIT.VER     ROMBIOS.COM
```

The Reference diskette also contains files for the Setup program and the System diagnostics program. However, you should always run these programs from the Reference diskette in drive A; so do not copy these files to your hard disk.

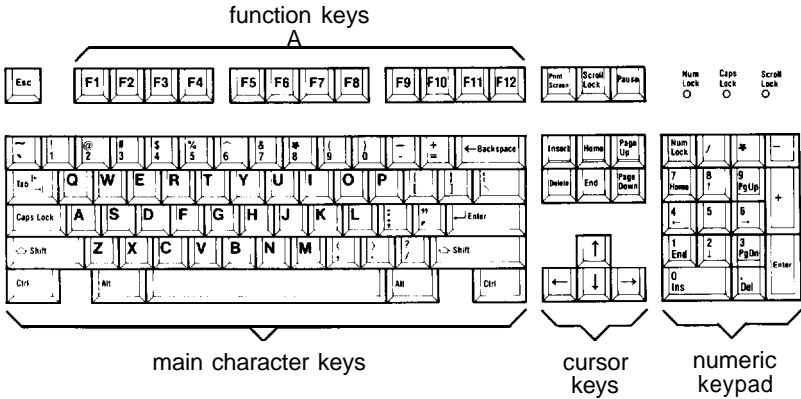
The Utility diskettes contain VGA drivers that allow you to display graphics in certain high-resolution modes. If you want to use any of these extended modes on your VGA monitor, you'll need to copy any VGA files you need to your hard disk as well. See Appendix A for a list of the VGA drivers and utilities and instructions for using them.

Note

Be sure to make backup copies of your Reference and Utility diskettes. See your MS-DOS Reference Manual for instructions.

Special Keys on the Keyboard

Certain keys on your keyboard serve special functions when your computer is running MS-DOS or application programs. The keyboard layout is shown below, and special keys are described in the table.



Key functions

Key	Purpose
Tab ← Tab →	Moves the cursor one tab to the right in normal mode and one tab to the left in Shift mode.
Caps Lock	Changes the letter keys from lower- to uppercase; changes back to lowercase when pressed again. The numeric/symbol keys on the top row of the keyboard and the symbol keys in the main part of the keyboard are not affected.
Shift	Produces uppercase characters or the top symbols on the keys when used with the main character keys. Produces lowercase characters when the Caps Lock function is on.
Ctrl	Works with other keys to perform special (control) functions, such as editing operations in MS-DOS and various application programs.

Key functions (continued)

Key	Purpose
Alt	Works with other keys to enter alternate character codes or functions.
+Backspace	Moves the cursor back one space, deleting the character to the left of the cursor.
J Enter	Ends a line of keyboard input or executes a command.
insert (Ins)	Turns the Insert function on and off.
Delete (Del)	Deletes the character marked by the cursor.
Home, End Page UP (PgUp) Page Down (PgDn) ↑ ← ↓ →	Control cursor location.
Num Lock	Changes the function of the numeric/cursor keys from entering numbers to positioning the cursor; changes back when pressed again.
Esc	Cancel the current command line or operation.
F1-F12	Perform special functions within application programs.
Print Screen (PrtSc)	Prints the screen display on a line printer.
Sys Rq (Req)	Generates the System Request function in some application programs (used with Aft).
Scroll Lock	Controls scrolling in some applications.
Pause	Suspends the current operation.
Break	Terminates the current operation (when used with Ctrl).

The **Caps Lock**, **Num Lock**, and **Scroll Lock** keys work as toggles; press the key once to turn on a function and again to turn it off. When the function is enabled, the corresponding light in the upper right corner of the keyboard is on.

Stopping a Command or Program

You may sometimes need to stop a command or program while it is running. Many programs provide a command you can use to cancel or even undo an operation. If you have entered an MS-DOS command that you want to stop, try one of the following commands:

- ❑ Hold down the **Ctrl** key and press **C**.
- ❑ Hold down the **Ctrl** key and press **Break**.

These methods may also work in your application program. If not, you may need to reset the computer as described below.

Caution

It is best not to turn off the computer to stop a program or command. If you created new data and have not yet stored it, the data will be erased if you turn off the computer. The computer stores your data in its memory area (RAM) until you save it; but the data is erased each time you turn off or reset the computer.

Resetting the Computer

Occasionally, you may want to clear the computer's current settings or its memory without turning it off. You can do this by resetting the computer.

For example, if an error occurs and the computer does not respond to your keyboard entries, you can reset it to reload MS-DOS and try again. However, resetting erases any data in memory that you have not saved; so reset only if necessary.

Caution

Do not reset the computer as a means to exit a program. Some programs classify **and** store new data when you exit a program in the normal manner. If you reset the computer without properly exiting a program, you may lose data.

To reset the computer, MS-DOS must be either on the hard disk or on a diskette in drive A; so if you do not have a hard disk, insert the Startup diskette in drive A.

There are two ways to reset the computer:

- ❑ If you are using MS-DOS, hold down Ctrl and Alt and press the Del key. The screen goes blank for a moment and then the computer should reload MS-DOS. If it doesn't, try the next method.
- ❑ Press the RESET button on the front panel. This method works even when the computer does not respond to your keyboard entries.

If resetting the computer does not correct the problem, you probably need to turn it off and reboot it. Remove any diskette(s) from the diskette drive(s). Turn off the computer and wait five seconds. If you do not have a hard disk, insert the Startup diskette in drive A. Then turn on the computer.

Using a Power-on Password

If you set a power-on password when you ran the Setup program, you must enter it every time you turn on or reset the computer. Follow these steps to use your password:

1. If you do not have a hard disk, insert your Startup diskette in drive A.
2. Turn on or reset the computer. The screen displays a key prompt:

3 

3. At the key prompt, type your power-on password. The key turns when you type a character, but the screen does not display the characters you type. Then press **Enter**.

After you type the password correctly and press **Enter**, a happy face character appears. Then the computer loads MS-DOS and displays the MS-DOS command prompt. (If you installed the Shell program when you installed MS-DOS, you see the Shell Start Programs menu instead of the command prompt.)

Note

If you turned on network server mode when you ran the Setup program, you need to use a different procedure to enter your password. See “Using Your Computer as a Network Server” in Chapter 4.

You have three chances to enter the correct password. If you do not enter the correct password at the key prompt, another key prompt appears. If you do not enter the correct password at the third key prompt, the screen displays a zero, the keyboard locks up, and you cannot use the computer. Reset the computer and try to enter the correct password again. (See “Resetting the Computer,” above, for instructions.)

Note

If you do not know the correct password, see “Password Problems” in Appendix D.

Changing a Power-on Password

To change your power-on password, follow these steps:

1. If you do not have a hard disk, insert your Startup diskette in drive A.
2. Turn on or reset the computer. At the key prompt, enter your current power-on password followed by a forward slash (/). After the slash, enter the new password you want to use. For example, if your current password is 123 and you want to change it to ABC, type:

123/ABC

Do not use characters requiring the **Shift** key, such as \$, @, or *, in your new password. The computer does not recognize the **Shift** key when you use your password to access the system.

The screen does not display what you type.

Caution

Be sure to remember the new power-on password you enter or write it down and keep it in a safe place. If you cannot remember the password you enter now, you will not be able **to** access your computer the next time you turn it **on**.

3. Press **Enter**. A happy face character appears and then the computer loads MS-DOS.

Next time you turn on or reset the computer, use the new password.

Deleting a Power-on Password

To delete your power-on password, follow these steps:

1. If you do not have a hard disk, insert your Startup diskette in drive A.
2. Turn on or reset the computer. At the key prompt, enter your current password followed by a forward slash. For example, if your password is 123, type:

1 2 3 /

3. Press **Enter**. A happy face character appears and then the computer loads MS-DOS.

The next time you turn on or reset the computer, it does not request a password and loads MS-DOS immediately.

Note

You need to know the password in order to delete it using this method. If you do not know the password, see “Password Problems” in Appendix D.

Using Disks and Disk Drives

The disk drives in your computer allow you to store data on disk, and then retrieve and use your stored data. This section explains how disks work and tells you how to:

- Use different types of diskettes and diskette drives
- Care for your diskettes and diskette drives
- Write-protect diskettes
- Use a single diskette drive system
- Insert and remove diskettes
- Format diskettes
- Make backup copies
- Use a hard disk drive.

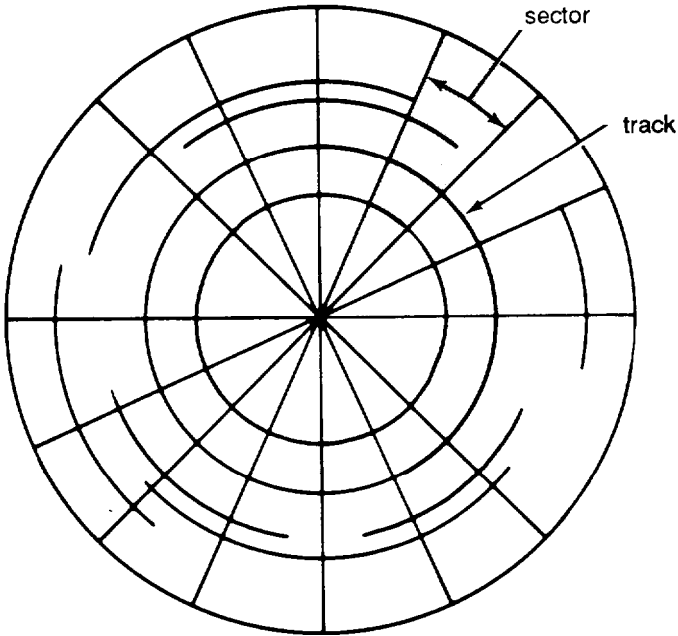
How Disks Store Data

Diskettes are made of flexible plastic coated with magnetic material. This plastic is enclosed in a square jacket that is either slightly flexible (5¼-inch diskette), or hard (3½-inch diskette).

Unlike a diskette, a hard disk is rigid and fixed in place. It is sealed in a protective case to keep it free of dust and dirt. A hard disk stores data the same way that a diskette does, but it works much faster and has a much larger storage capacity.

All disks are divided into data storage compartments by sides, tracks, and sectors. Double-sided diskettes store data on both sides. On each side are concentric rings, called tracks, on which the computer stores your data.

A disk is further divided by sectors, which are similar in shape to pie slices. The figure below provides a simple representation of tracks and sectors.



Double-sided, double-density diskettes have either 40 or 80 tracks on each side, and double-sided, high-density diskettes have 80 tracks on each side. Diskettes can have 8,9,15, or 18 sectors per track.

A hard disk consists of two or more platters stacked on top of one another and thus has four or more sides. In addition, a hard disk has many more tracks per side than a diskette, but the number of tracks depends on the capacity of the hard disk. The number of sectors depends on the type of hard disk.

Your computer uses the read/write heads in a disk drive to store and retrieve data on a disk. To write to a disk, the computer spins it in the drive to position the disk so that the area where the data is to be written is under the read/write head. A diskette has an exposed area where the read/write head can access it.

Because data is stored magnetically, you can retrieve it, record over it, and erase it—just as you play, record, and erase music on a cassette tape.

Types of Diskette Drives

The following list describes the four types of diskette drives you can use in your computer and which diskettes to use with them:

- ❑ 1.2MB drive—Use 5¼-inch, double-sided, high-density, 96 TPI (tracks per inch), 1.2MB diskettes. These diskettes contain 80 tracks per side, 15 sectors per track, and hold up to 1.2MB of information, which is approximately 500 pages of text.

Note

MB stands for megabyte, which equals 1024KB (or 1,048,576 bytes). KB stands for kilobyte, which equals 1024 bytes. Each byte represents a single character, such as A, \$, or 3.

- ❑ 1.44MB drive—Use 3½-inch, double-sided, high-density, 135 TPI, 1.44MB diskettes. These diskettes contain 80 tracks per side, 18 sectors per track, and hold up to 1.44MB of information, which is approximately 600 pages of text.

- ❑ 360KB drive—Use 5¼-inch, double-sided, double-density, 48 TPI, 360KB diskettes. (You can also use single-sided, 160KB or 180KB diskettes.) These diskettes contain 40 tracks per side and 8 or 9 sectors per track. With 8 sectors per track, a diskette holds up to 320KB. With 9 sectors per track, a diskette holds up to 360KB of information, which is approximately 150 pages of text.
- ❑ 720KB drive—Use 3½-inch, double-sided, double-density, 135 TPI, 720KB diskettes. These diskettes contain 80 tracks per side, 9 sectors per track, and hold up to 720KB of information, which is approximately 300 pages of text.

Note

You must format a new diskette before you can store data on it. See “Formatting Diskettes,” later in this section.

Drive and diskette incompatibilities

If your computer has more than one type of diskette drive, or if you use different types of diskettes, you need to be aware of certain incompatibilities between the drives and diskettes.

Because of the type and size differences, you cannot use a 3½-inch diskette in a 5¼-inch drive or vice versa. There are also limitations on using diskettes that are the same size as the drive but have different capacities. The following tables summarize the possibilities and limitations.

5¼-inch drive/diskette compatibility

Drive type	Diskette types it can read from and write to
360KB	360KB, 320KB, 180KB, 160KB
1.2MB	1.2MB, 360KB; 320KB; 180KB; 160KB*

* If you write to this diskette in a 1.2MB drive, you may not be able to read it or write to it in a 360KB drive later.

Drive type	Diskette types it can read from and write to
720KB	720KB
1.44MB	1.44MB, 720KB

Because of these incompatibilities, always indicate the diskette type and density when you label your diskettes. (Usually this information appears on the manufacturer's label.)

If you have any combination of the above drives (1.44 MB, 1.2MB, 720KB, or 360KB), you can copy files from one drive to another—using COPY or XCOPY—as long as the correct diskette type is in each drive. You can also use these commands to copy files between a hard disk and any type of diskette. However, you cannot use the MS-DOS DISKCOPY command to copy from one diskette drive to another if the two drives are not the same type. For more about copying files and diskettes, see your MS-DOS Reference Manual.

Caring for Diskettes and Diskette Drives

Follow these basic precautions to protect your diskettes and avoid losing data:

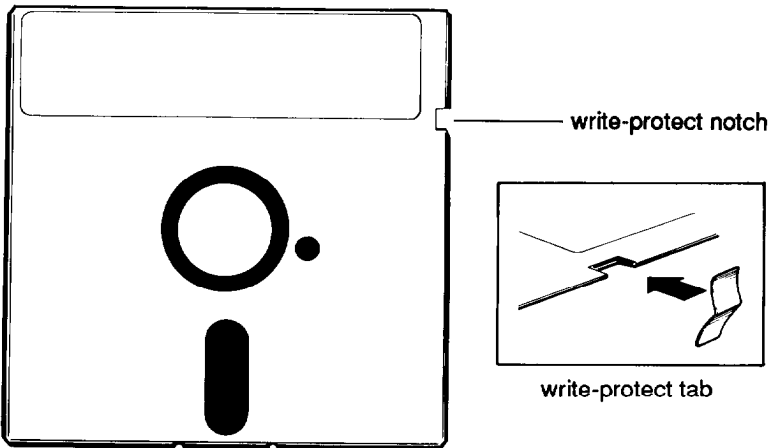
- If you have a diskette that contains data you don't want to accidentally write over or erase, be sure you write-protect it. This is especially important for your operating system and application program diskettes. See "Write-protecting Diskettes," below, for more details.
- Do not remove a diskette from the diskette drive or reset or turn off the computer while the drive light is on. This light indicates that the computer is copying data to or from a diskette. If you interrupt this process, you can destroy data.
- Remove all diskettes before you turn off the computer.

- ❑ Keep diskettes away from dust and dirt. Small particles of dust or dirt can scratch the magnetic surface, destroy data, and ruin the read/write heads in a diskette drive.
- ❑ Never wipe, brush, or try to clean diskettes in any way.
- ❑ Keep diskettes in a moderate environment. They work best at normal room temperature and in normal humidity. Don't leave diskettes sitting in the sun, or in extreme cold or heat.
- ❑ Keep diskettes away from magnetic fields. (Remember that diskettes store information magnetically.) There are many magnetic sources in your home or office, such as electrical appliances, telephones, and loudspeakers.
- ❑ Do not place diskettes on top of your monitor or near an external hard disk drive.
- ❑ Always hold a 5¼-inch diskette by its protective jacket and never touch the magnetic surface exposed by the read/write slot. The oils on your fingertips can damage it.
- ❑ Do not place anything on top of your diskettes, and be sure they do not get bent.
- ❑ Carefully label your diskettes and indicate the type and density. Attach the label only along the top of a diskette (next to the manufacturer's label). Do not stick several labels on top of one another; too many labels can make it difficult to insert and remove the diskette in the drive.
- ❑ Write on a diskette label before you attach it to the diskette. If you need to write on a label that is already on the diskette, use only a soft-tip pen-not a ballpoint pen or a pencil.
- ❑ Store diskettes in their protective envelopes and in a proper location, such as a diskette container. Do not store diskettes flat or stack them on top of each other.

Write-protecting Diskettes

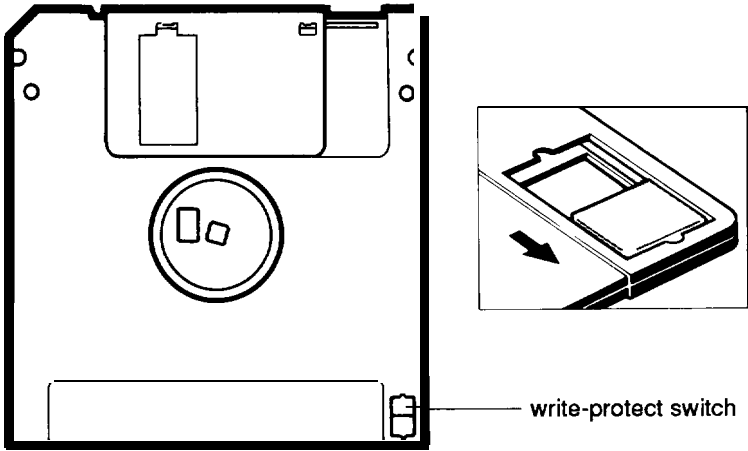
You can write-protect a diskette to prevent its data from being altered. When a diskette is write-protected, you can read it and copy data from it, but you cannot store new data on it or delete any files it contains. If you try to change data stored on a write-protected diskette, MS-DOS displays an error message.

To write-protect a 5/4-inch diskette, cover the small, rectangular notch (shown below) with an adhesive write-protect tab. Write-protect tabs usually are included in a new package of blank 5/4-inch diskettes.



To remove the write protection, peel off the write-protect tab.

On a 3½-inch diskette, the write-protect device is a small switch on the back of the diskette in the lower right corner, shown below. To write-protect a 3½-inch diskette, slide the switch toward the edge of the diskette until it clicks into position, exposing a hole in the corner.



To remove the write protection, slide the switch toward the center of the diskette until it clicks into position and the hole is covered.

Note

Some program diskettes have no notch or switch so they are permanently write-protected. This protects them from being accidentally erased or altered.

Using a Single Diskette Drive System

MS-DOS expects the computer to have at least two diskette drives and displays prompts and messages accordingly. Usually, MS-DOS recognizes the first diskette drive (the top drive) as A and a second diskette drive as B. If you have only one diskette drive, MS-DOS can treat it as both A and B when you need to perform operations that normally require two diskette drives.

For example, if you enter a command to copy data from A to B, MS-DOS copies the data from the first diskette you place in the drive (which would be drive A) to the computer's memory. Then MS-DOS prompts you to insert another diskette (for drive B) and copies the data from memory to the new diskette. When copying is complete, you see a prompt to insert the original diskette (A).

Because you may often swap diskettes this way, it is important to remember which diskette is which. It is also a good idea to write-protect your original diskette. See "Write-protecting Diskettes," above.

If you have a hard disk and one diskette drive, you can load the operating system and application programs from the hard disk, create and store your data there, and use the diskette drive just for copying data to or from diskettes.

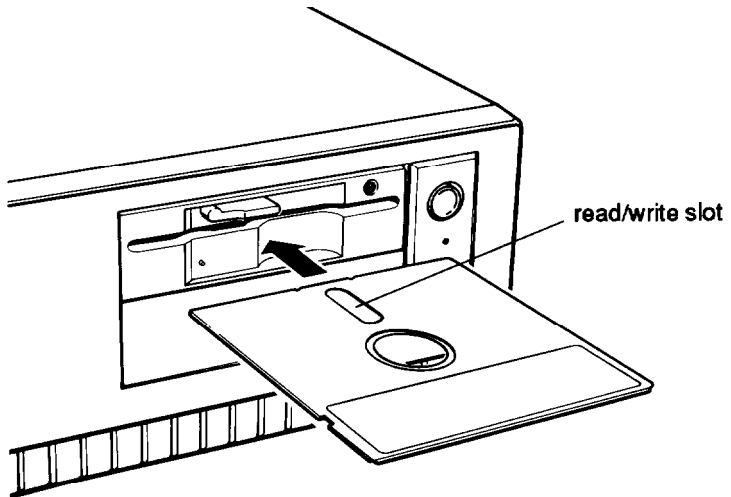
However, if you have only one diskette drive and no hard disk, you need to use that drive to load the operating system as well as any application program you are using. First, insert the operating system diskette (the Startup diskette, for example) in drive A and load the operating system; this copies it to the computer's memory (RAM) so you do not need to leave the system diskette in the drive. Then remove the system diskette and insert your application program diskette to load that data into memory, too. See your application program manual for detailed instructions.

Note

You can load MS-DOS from an application program diskette if that diskette contains the operating system. See your MS-DOS Reference Manual for information about creating a system diskette.

Inserting and Removing Diskettes

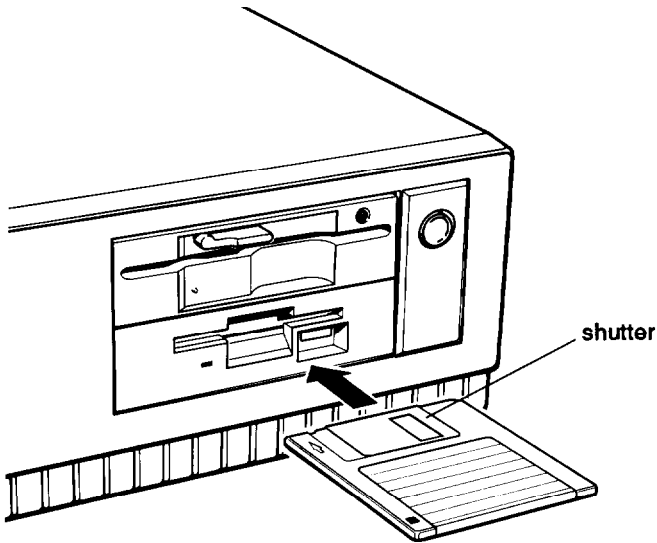
If you have a 5¼-inch diskette drive, insert a diskette as follows: hold the diskette with the label facing up and the read/write slot leading into the drive, as shown below.



Slide the diskette into the slot until it is in all the way. Then turn the latch down to lock it in a vertical position. This keeps the diskette in place and allows the read/write heads in the diskette drive to access the diskette.

When you want to remove a diskette, first make sure the disk drive light is off. Then flip up the latch and carefully pull out the diskette. Place it in its protective envelope and store it in a proper location, such as a diskette container.

If you have a 3/4-inch diskette drive, insert the diskette with the label facing up and the metal shutter leading into the drive, as shown in the following illustration. Slide the diskette into the drive until it clicks into place.



When you want to remove the diskette, make sure the drive light is off; then press the release button. When the diskette pops out, remove it and store it properly.

Caution

Never remove a diskette or reset or turn off the computer while a diskette drive light is on. You could lose your data. Also, be sure to remove all diskettes before you turn off the computer.

Formatting Diskettes

Before you can store data on a new diskette, you must format it using the `FORMAT` command. Formatting prepares the diskette so that MS-DOS can write data on it. You need to do this only once, before you use the diskette for the first time.

You can also reformat previously used diskettes to store new data. This process erases all the data on the diskette, so be sure you do not want to save any of the files on a diskette before you format it. See your MS-DOS Reference Manual for instructions on using the `FORMAT` command.

Making Backup Copies

It is important to make copies of all your data and system diskettes. Make backup (or working) copies of all diskettes that contain programs, such as your MS-DOS diskettes and the original Reference and Utility diskettes that came with your computer. Then use only the copies. Store the original diskettes in a safe place away from your working diskettes. Also, copy your data diskettes regularly, whenever you revise them (to keep them up-to-date) and store them away from your originals.

If you have a hard disk, you'll probably use it to store the programs and data files you use regularly. Keep backup copies of all your files on diskettes.

You can copy your data in several ways:

- ❑ You can use the `COPY` or `XCOPY` command to copy individual files or groups of files.
- ❑ You can use the `DISKCOPY` command to make an exact duplicate of a diskette.

- ❑ You can use the `BACKUP` command to back up hard disk files to diskettes. Because `BACKUP` can split large files across two or more diskettes, it makes more efficient use of diskette space than `COPY` or `XCOPY`. It also allows you to back up files that are larger than the capacity of your diskettes.

See your MS-DOS Reference Manual for instructions on using these commands.

Using a Hard Disk Drive

Using a hard disk is similar to using a diskette. However, the hard disk provides several advantages:

- ❑ A 100MB hard disk can store as much data as approximately eighty-two 1.2MB diskettes.
- ❑ Your computer can perform all disk-related operations faster.
- ❑ You can store frequently used programs and data files on the hard disk, eliminating the inconvenience of swapping diskettes to access different files.

The added storage capacity makes it easy to move back and forth between different programs and data files. However, because it is so easy to add programs and files to your hard disk, you may find yourself trying to organize hundreds of files.

MS-DOS lets you keep related files together in directories and subdirectories so they are easy to find and use. See your MS-DOS Reference Manual for instructions on managing your files and directories.

A hard disk must be partitioned and formatted before you can use it. Be sure you have performed the procedures in your MS-DOS Installation Guide to prepare your hard disk for use.

Backing up the hard disk

While the hard disk is very reliable, it is essential to back up your hard disk files to diskettes in case you lose some data accidentally. Make copies of all your system and application program diskettes before copying the programs to the hard disk. After you create data files on the hard disk, be sure to copy them to diskettes whenever you revise them to keep your backup diskettes up-to-date.

Caring for your hard disk drive

Follow these precautions to protect your hard disk drive from damage and to avoid losing data:

- Never turn off or reset the computer when the hard disk access light is on. This light indicates that the computer is copying data to or from the hard disk. If you interrupt this process, you can lose data.
- Never attempt to open the hard disk drive. The disk itself is enclosed in a sealed container to protect it from dust.
- Before you move your computer even a short distance, you need to run the HDSIT program to prepare the hard disk for moving, as described below.

Preparing the hard disk for moving

If you need to move your computer to a new location-whether it is across the country or just across the room-you should run the HDSIT program to protect the hard disk during the move.

The HDSIT program moves the disk drive's read/write heads to a region on the disk surface that does not contain data, and locks them securely in position. This protects the hard disk from being damaged if the computer is bumped accidentally.

Follow these steps to run HDSIT:

1. Exit any program you are using and make sure the MS-DOS command prompt appears on the screen.
2. If you copied HDSIT to your hard disk (as described at the beginning of this chapter), type `C :` and press **Enter** to log onto the root directory of the hard disk.

If you do not have a hard disk or you did not copy HDSIT to drive C, insert the Reference diskette in drive A. Then type `A :` and press **Enter** to log onto that drive.

3. Type the following and press **Enter**:

```
HDSIT
```

You see a message on the screen that tells you the disk drive's read/write heads will remain locked until you reset the computer or turn the power off and on again. The computer locks the heads and disables the keyboard. Remove any diskettes and turn off the computer. You are now ready to move it to the new location.

Note

If your computer came with a 5¼-inch diskette drive and you still have the original diskette drive protector card, you may want to insert it into the drive prior to shipping your computer to protect the read/write heads.

Chapter 4

Enhancing System Operations

This chapter tells you how to use the following procedures to enhance the operation of your computer:

- Using AUTOEXEC.BAT and other batch files
- Changing the processor speed
- Reassigning the diskette drives
- Using your computer as a network server
- Using expanded memory beyond 640KB
- Using special VGA features.

Using AUTOEXEC.BAT and Other Batch Files

As you get used to using MS-DOS and your application programs, you may find that there are commands you need to run frequently. You can automate the execution of these commands by listing them in a special file called a “batch” file. When you type the name of the batch file **and** press **Enter**, MS-DOS executes the commands in the file just as if you had typed each command from the keyboard.

If you have a word processing program that can save a file as a text-only file (sometimes called an ASCII file), you can use that program to create a batch file. You can also use the MS-DOS COPY or EDLIN command to create the file. See your MS-DOS Reference Manual for instructions on creating and using batch files.

One batch file that you may find particularly useful is called AUTOEXEC.BAT. Every time you turn on your computer, MS-DOS looks for the AUTOEXEC.BAT file and automatically executes each of the commands.

When you install MS-DOS, it automatically creates an AUTOEXECBAT file for you. To create or modify the file, you can use the same programs that you use to create any other batch file (COPY, EDLIN, or a word processing program that can save a file as a text-only file). However, be sure to name the file AUTOEXEC.BAT and store it in the root directory of the hard disk or diskette from which you load MS-DOS.

See your MS-DOS Reference Manual for more information about your AUTOEXEC.BAT file.

Changing the Processor Speed

Your computer's processor can operate at two speeds: high and low. High speed is 25 MHz and low speed simulates an 8 MHz processor speed. On high, the computer can access memory faster than on low. Your processor is set to operate at high speed unless you change the speed to low or set the speed to change automatically.

Note

When your computer is operating at high speed, the **TURBO** light on the front panel is illuminated. The **TURBO** light is off when your computer is operating at low speed.

You should use high speed for almost everything you do since your programs will work faster. However, certain application programs have specific timing requirements for diskette access and can run only at the slower speed. See the manual for your program to determine if this is the case.

Some copy-protected programs require the computer to run at low speed while accessing the program on a diskette. These programs also usually require you to leave a key disk-the diskette that contains the copy protection-in the diskette drive. If you use a copy-protected program often, you may want to set your processor speed to change automatically to low speed when accessing the diskette and return to high speed when it is finished.

There are different types of copy-protected programs. Depending on the type you have, you may or may not want to set the processor to automatic speed. Follow these guidelines:

- ❑ If you are using a copy-protected program that can run only on a diskette or that requires a key disk, try to load the program on high speed. If this works, you do not need to set the speed to change automatically. If you can't load the program on high, set the speed to change automatically.
- ❑ If you are using a copy-protected program that does not require a key disk but requires a special procedure to install the program on a hard disk, set the speed to low while you are installing the program. Once it is installed, set the speed to high, where you should be able to leave it while you load and run the program.

If this does not work, try installing and loading the program at low speed and then change to high speed to run it. Do not set the speed to change automatically.

There are three ways to change the processor speed:

- ❑ Run the Setup program on your Reference diskette
- ❑ Enter a keyboard command
- ❑ Run the ESPEED program.

If you frequently use programs that require the processor to operate at low speed or require the automatic speed change when your computer is accessing a diskette, use Setup to change the processor speed. See Chapter 2 for instructions.

If you use these programs only occasionally, you should use the keyboard commands or the ESPEED program (described below) to change the processor speed.

Entering Keyboard Commands

You can change the processor speed by entering one of the following commands at the MS-DOS prompt:

- | | |
|------------|----------------------------------------------------------------------------|
| Ctrl Alt + | Changes the speed to high (25 MHz). |
| Ctrl Alt - | Changes the speed to low (simulated 8 MHz). |
| Ctrl Alt * | Tells the computer to change to low speed when it is accessing a diskette. |

For the +, -, and * characters, press the keys on the numeric keypad. The commands do not work if you use the characters on the main keyboard.

Note

You can use the commands listed above while you are running a program. However, if you are running a program that uses one of the same commands for another function, you cannot use that command to change the processor speed. For example, if you are running a program that uses the Ctrl Alt - command to move the cursor, you cannot enter Ctrl Alt - to change the processor speed to low. When you exit the program, you can enter these commands at the MS-DOS prompt. Another alternative is to use the ESPEED program, described below.

To enter these commands, hold down the **Ctrl** key and the **Alt** key and press the **+**, **-**, or ***** key located on the numeric keypad. The speed setting remains in effect until you press the **RESET** button or turn off the computer, or until you change it again using the Setup program, another keyboard command, or the ESPEED program, described below.

Using the ESPEED Program

The ESPEED program allows you to change the processor speed to high or low, or set the speed to change automatically. This method is convenient if your application program does not recognize the **Ctrl** keyboard commands or if you want to include the program command in a batch file.

The ESPEED program is provided with your system on the Reference diskette. If you do not have a hard disk, insert your Reference diskette in drive A and log onto drive A before you enter the command to start the program.

If you have a hard disk drive, copy the file ESPEED.EXE from your Reference diskette onto your hard disk-if you have not already done so-and run the program from there. (See Chapter 3 for more information.)

To run the ESPEED program, type the following at the MS-DOS command prompt: and press **Enter**:

```
ESPEED
```

You see the following message:

```
Usage: ESPEED [/H][/L][/A]
        /High      set High speed (no auto)
        /Low       set Low speed (no auto)
        /Auto      set Auto speed
```

The message tells you the switches you should use to set the speed to high, low, or automatic speed. At the MS-DOS prompt, type the ESPEED command again and include the appropriate switch, such as the following:

```
ESPEED /A
```

This command sets the processor speed to change to low speed automatically when the computer accesses a diskette.

If you include the switch when you type the initial ESPEED command, the program changes the speed without displaying the command options.

The processor speed you set remains in effect until you press the RESET button or turn off the computer, or until you change it using the Setup program, a keyboard command, or the ESPEED program again.

Entering the ESPEED command in a batch file

You may want to run the ESPEED program by including the command in a batch file. For example, if you have a program called SAMPLE which requires an 8 MHz processor speed when the program is running on a diskette, you could include the following commands in a batch file to start the SAMPLE program:

```
ESPEED /A  
SAMPLE
```

You could name the batch file SAMP.BAT. Whenever you need to run the SAMPLE program, insert the program diskette into drive A. Then type SAMP and press **Enter**.

The computer changes the processor speed to automatic and starts the SAMPLE program. When you access the program on the diskette, the speed changes to low and then returns to high when you are finished.

See your MS-DOS Reference Manual for instructions on creating and using batch files.

Reassigning the Diskette Drives

If your system has two diskette drives, they are connected inside your computer so that the top drive is A and the bottom drive is B. Because drive A is the “boot” drive, whenever you want to load the operating system or a bootable program from a diskette, you must insert the diskette into drive A.

If both of your drives are the same type—5¼-inch, 1.2MB capacity, for example—you never need to reassign the drives. If your two drives are different types, however, you may need to change the drive letter assignments so you can boot the computer from drive B. For example, you may have a 3½-inch program disk which you need to use to boot the computer. Or you may have an application program that requires you to leave the 3½-inch key disk in drive A while you run the program.

For these situations, you can reverse the drive assignments to make the top drive B and the bottom drive A. There are two ways to do this:

- ❑ Insert the diskette in the drive you want to boot from and turn on the computer. The drive automatically becomes drive A.
- ❑ Run the AFDD program to reassign the drive. See “Using the AFDD Program,” below, for instructions.

Your assignments remain in effect until you press the **RESET** button or turn off the computer, or until you reassign the drives to their original assignments. The reassignment remains in effect if you reset the computer from your hard disk by entering the **Ctrl Alt Del** command.

Using the AFDD Program

The AFDD program reverses the current diskette drive assignments and resets the system. When you are done using the reversed drive assignments, you can use the AFDD program again to reassign the drives to their original configuration.

The AFDD program is provided with your system on the Reference diskette. If you do not have a hard disk, insert your Reference diskette in drive A and log onto drive A before you enter the command to start the program.

If you have a hard disk drive, copy the file AFDD.EXE from your Reference diskette onto your hard disk (if you have not already done so); then you can run the program from there. See Chapter 3 for more information.

To run the AFDD program, type the following at the MS-DOS command prompt and press **Enter**:

```
AFDD
```

You see a message such as the following:

	New Assign		Present
Drive A:	1.44MB	<=	1.2MB
Drive B:	1.2MB	<=	1.44MB

(S)et and Reboot, Any other key to
abort ?

If you inserted the Reference diskette to run the AFDD program, remove it now.

If you want to change the drive assignments, press S. The system reboots and loads MS-DOS, and the new drive assignments take effect. If you do not want to change the drive assignments, press any other key.

If you are running the AFDD program from a hard disk, you can reassign the drives and reset the computer automatically. Type the following command and press **Enter**:

```
AFDD /S
```

The `/S` switch tells the AFDD program to reset the computer, load MS-DOS, and change the diskette drive assignments without displaying the message.

Note


You may want to run the AFDD program by including the command in a batch file. See your MS-DOS Reference Manual for instructions on creating and using batch files.

Using Your Computer as a Network Server

If your computer is set up in a network, you may want to use your system as the network server. A network server is the master computer in a network and provides storage space for the other computers connected to it. The network server can write files to and read files from the other computers, making it the most powerful computer in a network.

Even if no one is typing commands at the network server keyboard, the server can process commands sent to it from other computers. When your computer is operating in this special situation, you may want to prevent unauthorized users from entering commands at the network server keyboard. To provide this security, you can enable a power-on password in network server mode.

When you enable a power-on password but do not use network server mode, you enter the password before the computer loads MS-DOS. Once you load MS-DOS, anyone can access your system by typing commands on the keyboard. However, if you enable a power-on password and turn on network server mode, you can load MS-DOS before you enter the password. This allows other computers in the network to access the system, but prevents unauthorized users from entering commands at your keyboard and using any network server access privileges.

When you boot the computer in network server mode, you do not see the key prompt () to tell you when to enter the password (as you would if network server mode was turned off). The password prompt is hidden to prevent unauthorized users from knowing that a password is required.

You do not have to set a password or enable network server mode to use your computer as a network server, but it prevents unauthorized access to your computer when it is operating in this special situation.

See “Setting the Power-on Password” in Chapter 2 for instructions on how to set a power-on password and enable network server mode.

Note

If your hard disk drive has a partition larger than 32MB, you must use the MS-DOS SHARE command to install file sharing and locking protection in a network environment. See your MS-DOS Reference Manual for more information about SHARE.

If you do not install SHARE, the following message flashes on your screen after you install your networking software and reboot your computer:

```
WARNING! SHARE should be loaded for  
large media
```


Using a Password in Network Server Mode

When you turn on or reset the computer, it loads MS-DOS and you see either the MS-DOS command prompt or the first screen displayed by your networking software. You do not see the key prompt (⓪-Ⓜ) even though the computer is now waiting for you to enter the correct password.

Follow these steps to enter your password:

1. Turn on or reset your computer.
2. Type your password and press **Enter**. The screen does not display what you type.

Now you should be able to use your computer as desired. Press a key such as **Enter** to see if the keyboard accepts your command. If you entered an incorrect password, the computer does not respond. Type the correct password, press **Enter**, and try using the computer again.

Note

You cannot change or delete a power-on password and remain in network server mode. You must run Setup on the Reference diskette to turn off network server mode first. See Chapter 2 for instructions. Then you can change or delete the password by following the instructions in Chapter 3.

If you forget the power-on password, see “Password Problems” in Appendix D.

Using Expanded Memory Beyond 640KB

The Equity 386/25 PLUS comes with 2MB of random access memory. MS-DOS and your application programs that run under MS-DOS use the first 640KB of memory. You can use the unused memory above 640KB as extended memory, or you can use it as expanded memory, as described below.

Expanded memory can be used by application programs (such as Lotus® 1-2-3®) that support the Lotus/Intel/Microsoft Expanded Memory Specification (LIM 4.0 EMS). To take advantage of expanded memory, you need to use a memory manager to convert the computer's extended memory to expanded memory.

If you selected a memory management software package when you bought your Equity 386/25 PLUS, you can use the memory manager with either version of MS-DOS. Just follow the instructions included with the package.

If you are using version 4.01 of MS-DOS and you did not get a memory manager, you can use the MS-DOS program EMM386.SYS to convert your extended memory to expanded memory. See your MS-DOS Reference Manual for instructions on using EMM386.SYS.

If you are using version 3.3 of MS-DOS and you did not get a memory manager with your system, ask your authorized Epson dealer which expanded memory manager program you should use.

Using Special VGA Features

Your built-in VGA (video graphics array) display adapter supports both standard VGA monitors and multi-frequency monitors with analog connectors in non-interlaced mode. The VGA adapter allows these monitors to operate in all standard VGA modes without requiring any special device drivers. However, if you want to use extended or super-extended VGA modes, you can install one or more of the device drivers provided on the Utility diskettes that came with your system. These drivers allow you to use all of the capabilities of your monitor and your built-in VGA display adapter.

The device drivers provide VGA features such as these:

- Resolutions of 800 x 600 or 1024 x 768 in graphics modes with 16 colors
- Resolutions up to 640 x 480 in graphics modes with 256 colors
- 132-column text mode in 16 colors
- Graphics cursor movement performed by the built-in VGA hardware.

Note

To use graphic display drivers in 800 x 600 or 1024 x 768 resolutions, you must have a multi-frequency monitor capable of displaying these resolutions. Standard VGA monitors are not able to display them.

The Utility diskettes that came with your system contain device drivers for various application programs that require them. The diskettes also provide the following special utilities:

VGAMODE	The VGAMODE utility provides 132-column text in text-based programs such as WordStar@ and WordPerfect?
SETVGA	The SETVGA utility sets the built-in VGA adapter to emulate the operation of a variety of graphics adapters.
MODETEST	The MODETEST utility tests all of the video modes available on your monitor and displays the results on the screen.
WS33INST	The WS33INST utility patches (modifies) the WordStar, version 3.3, program file so you can use 132-column text mode.
SNOOZE	The SNOOZE utility automatically turns off your VGA display when you have not used your computer for a specified period of time.

See Appendix A for more information about the VGA device drivers and the utilities,

Installing and Removing Options

You can enhance the performance of your computer by adding a variety of options, including the following:

- Option cards
- Memory modules
- A math coprocessor.

An option card is a circuit board you install in your computer to add a particular function. Most option cards contain a device, such as a modem, or provide an interface, such as a connector to which you connect a monitor. This chapter describes how to install option cards and configure your computer for use with them.

Memory modules--also called SIMMs (single inline memory modules)--allow you to increase the amount of memory in your computer. This chapter describes the types and amounts of SIMMs you can use in your computer. If you want to install memory modules, it is best to ask your dealer to do it for you. You can, however, follow the instructions in this chapter to install them yourself.

Note

It is best not to add memory to your computer by installing an optional memory card. Any memory card you could install would be 16-bit and would cause your 32-bit computer to work slower. Using memory modules is more efficient since you do not need to use one of your options slots to add memory. Your computer can also access memory installed on memory modules faster than memory installed on a card.

A math coprocessor speeds up the numeric calculations your computer performs when using certain application software. If you purchase a math coprocessor, it is a good idea to ask your dealer to install it for you, because it can be damaged easily. If you decide to install it yourself, follow the steps in this chapter.

This chapter also explains how to change the jumper settings inside the computer. You need to change jumper settings if you add memory modules, install certain types of option cards, or want to change the way your computer operates.

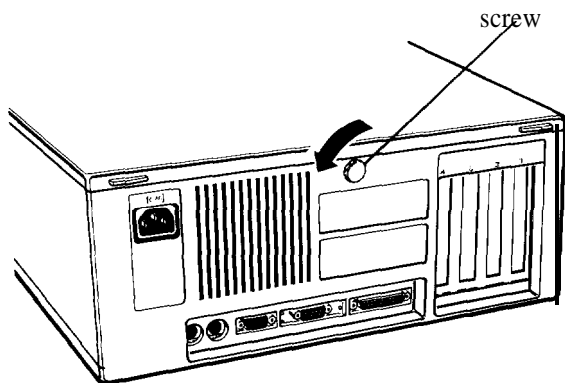
Before you can change jumper settings or install any of the options mentioned above, you need to remove the cover from the computer. Be sure to heed all the warnings in this chapter so you do not injure yourself or damage the computer.

Removing the Cover

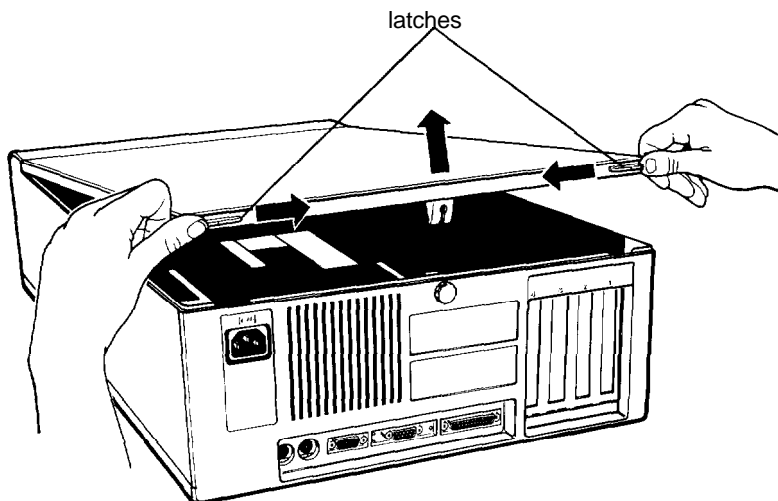
To install optional equipment or change jumper settings, you need to remove the cover from your computer. Follow these steps:

1. Turn off the computer and then any peripherals (including the monitor and printer).
2. Disconnect the computer's power cable from the electrical outlet and from the back panel. Then disconnect any peripheral cables that are connected to the computer, including the keyboard cable.
3. If the monitor is on top of the computer, lift it off and set it to one side.

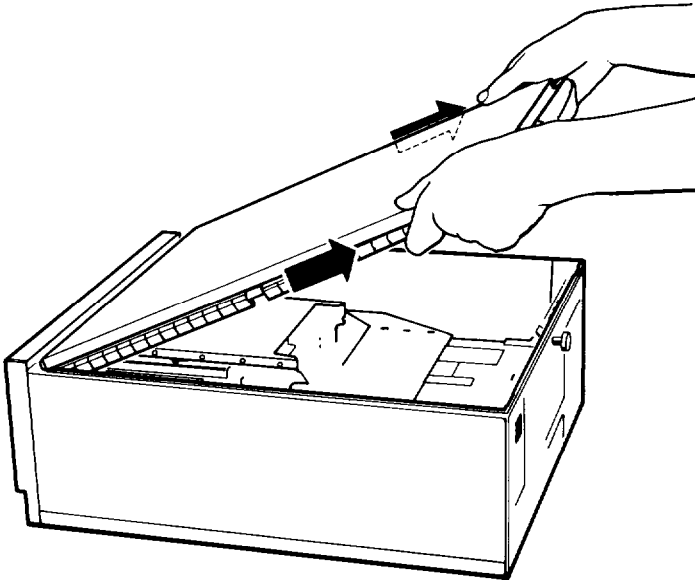
4. Turn the computer around so you are facing the back panel. As shown below, the cover is secured by a large screw on the back panel. Turn the screw counterclockwise to unlock the cover.



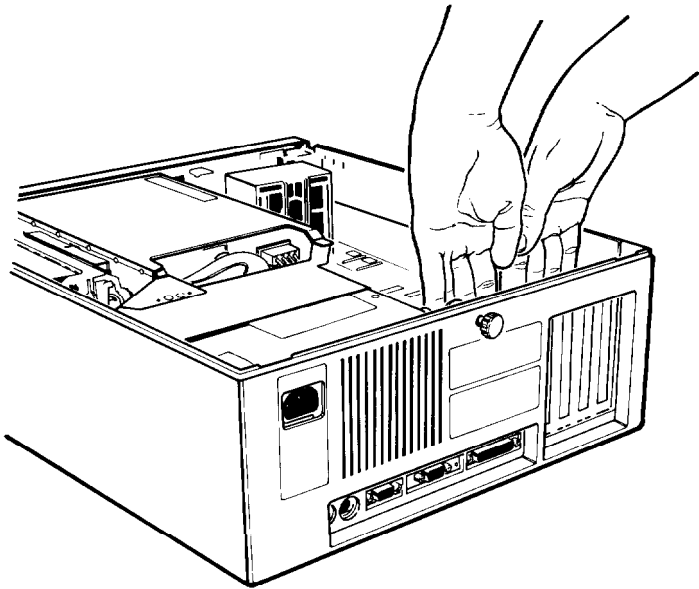
5. The cover is also secured by two latches on the back of the cover near the corners. Press both latches inward and then lift up the cover from the back panel. You might meet some resistance from the grounding tabs along the inside of the cover.



6. Pull the cover away from the front of the computer to completely remove it. Then set it aside.



7. Before you touch any of the components inside, touch the inside of the computer's back panel, as shown below, to ground yourself and avoid an electric shock.



WARNING

Be sure to ground yourself to the inside back panel of the computer every time you remove the cover. If you are not properly grounded, you could generate an electric shock when you touch a component.

Changing the Jumper Settings

If you change your computer's configuration or need to alter the way it operates, you may need to change a jumper setting inside the computer.

A jumper is a small electrical connector that controls one of the computer's functions. The jumper settings in your computer are preset at the factory; however, you can control certain features by changing the standard settings as follows:

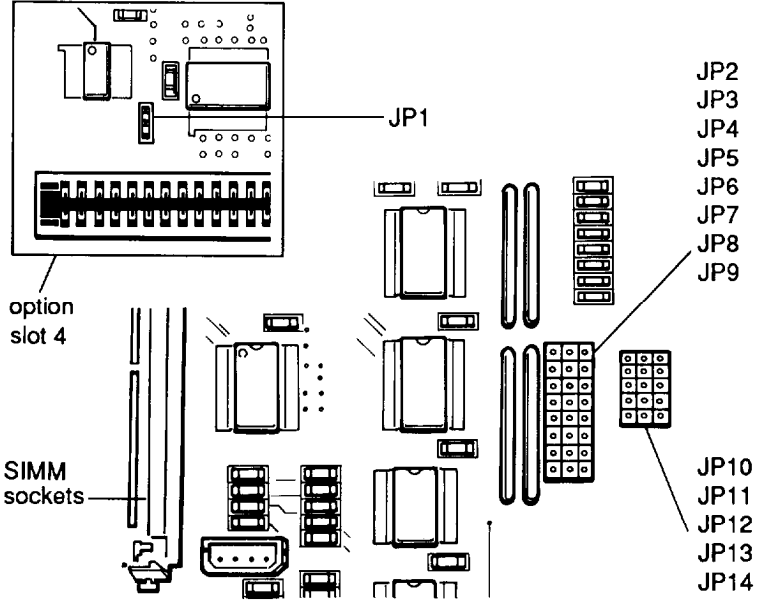
- Enable or disable the built-in mouse connector
- Enable or disable a mouse installed on an option card
- Set your monitor type to monochrome or color
- Change the amount of your base memory
- Enable or disable the power-on password function
- Enable or disable the built-in VGA display adapter
- Change the operation of the input \output ready signal.

If you add more memory to your computer by installing memory modules, you must set a group of jumpers to indicate the amount of memory you now have.

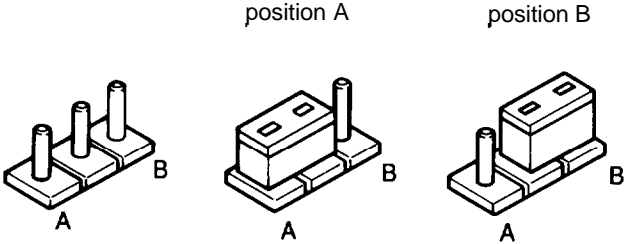
If you need to change any jumper settings, follow the instructions below.

Setting the Jumpers

Turn the computer so the back panel faces left and the front panel faces right. The illustration below shows the locations of the jumpers.



A jumper's setting is determined by where the jumper is placed on the pins. The jumper either connects pin A and the middle pin (position A) or connects pin B and the middle pin (position B), as shown below.



To move a jumper from one position to the other, use needle-nose pliers or tweezers to pull it off its pins and gently move it to the desired position. Be careful not to lose the jumper.

Caution

Be careful not to bend the jumper pins or damage any surrounding components on the main system board.

The following tables list the jumper settings and their functions.

Miscellaneous jumper settings

Jumper number	Jumper setting	Function
JP1	A B*	Enables the early input/output ready signal Sets a normal input/output ready signal
JP10	A B	Enables the built-in mouse connector Disables the built-in mouse connector so you can use a mouse or other pointing device connected to a port on an option card in your computer
JP11	A B*	Enables a mouse connector on an option card installed in your computer Disables a mouse connector on an option card so you can use the built-in connector in your computer
JP12	A* B	Color monitor is installed Monochrome monitor is installed
JP13	A B*	Disables the power-on password Enables the power-on password
JP14	A* B	Enables the built-in VGA display adapter Disables the built-in VGA display adapter so you can use a display adapter on an option card in your computer as your primary adapter

* Factory settings

Note: Jumper JP9 is not used

Jumper settings for base memory

Base memory	Jumper JP2	Jumper JP3
640KB	A*	A*
512KB	A	B
256KB	B	B

* Factory settings

Jumper settings for extended memory

Total memory	Jumper JP4	Jumper JP5	Jumper JP6	Jumper JP7	Jumper JP8
1MB	B	B	B	B	B
2MB*	B	A	B	B	B
3MB	B	A	B	B	A
4MB(a)	B	A	B	A	A
4MB(b)	A	B	B	B	B
6MB	B	A	A	B	A
8MB	A	A	B	B	B
9MB	A	A	B	B	A
10MB(c)	B	A	A	A	A
10MB(d)	A	A	B	A	A
12MB	A	A	A	B	A
16MB	A	A	A	A	A

* Factory settings

- (a) Configured using 256KB SIMMs in all banks
- (b) Configured using four 1MB SIMMs in Bank 0
- (c) Configured using eight 256KB SIMMs in banks 0 and 1 and eight 1MB SIMMs in banks 2 and 3
- (d) Configured using eight 1MB SIMMs in banks 0 and 1 and eight 256KB SIMMs in banks 2 and 3

If you need to change any jumper settings, follow these steps:

1. Remove any option cards that may be blocking your access to the jumpers. See page 5-15 for instructions.
2. Change the jumper settings as necessary.
3. Replace any option cards you removed. See “Installing an Option Card,” below.
4. Follow the instructions on page 5-30 to replace the computer’s cover.

Installing an Option Card

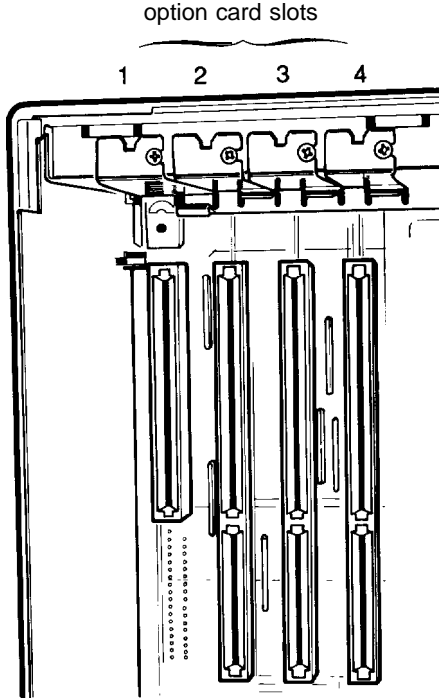
Your computer has four standard option slots: three 16-bit slots and one B-bit access slot. Each slot can accommodate an option card. You can buy option cards from authorized Epson dealers as well as other vendors.

This section explains how to install option cards in your computer. Later on, you may need to remove an option card to access jumpers, memory modules, or a math coprocessor. If so, see “Removing an Option Card” on page 5-15 for instructions.

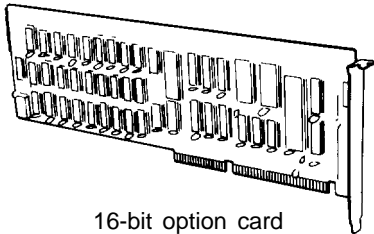
Note

After you install or remove an option card, see “Post-installation Setup” at the end of this chapter to configure your computer to operate with or without the option card.

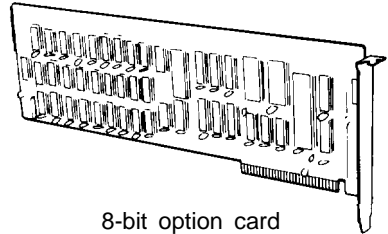
The illustration below shows the four standard option slots inside your computer.



Slot 1 is designed for an 8-bit option card and slots 2 through 4 are designed for 16-bit cards. As you can see below, a 16-bit card has an extra connector along the bottom.



16-bit option card



8-bit option card

Usually it does not matter which slot an option card occupies as long as the card fits in the slot. For example, you can place some 8-bit cards in a 16-bit slot. However, you must follow these guidelines when deciding which slot to use:

- ❑ An 8-bit card with an additional tab along the bottom must go into an 8-bit slot.
- ❑ If you install a disk drive that uses a controller card, place the card as close as possible to the drive it is controlling.
- ❑ Some option cards must be installed in a specific slot. Consult the instructions that come with the card to see if this is the case.

Follow these steps to install an option card:

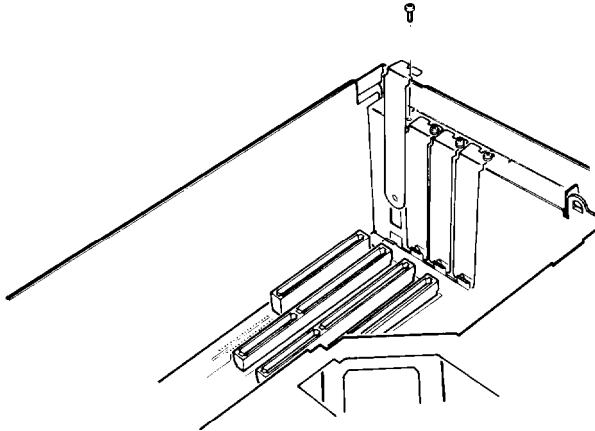
- o If you have not already done so, remove the cover from the computer. (See page 5-2 for instructions.)

WARNING

After you remove the cover, touch the inside back panel of the computer to ground yourself and avoid an electric shock.

2. If you are installing an option card that controls a mouse, you need to change the settings of jumpers JP10 and JP11 before you install the card. If you install a display adapter card, you may need to change the settings of jumpers JP12 and JP14. If this is the case, see page 5-6 for instructions.

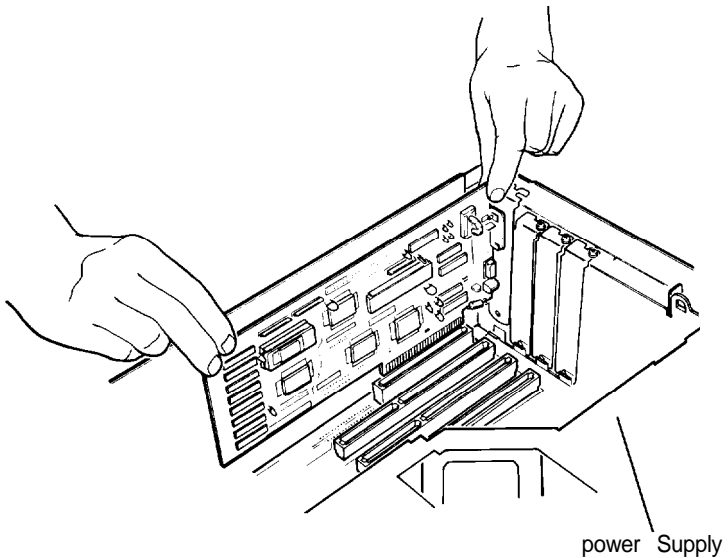
3. Remove the retaining screw from the top of the metal option slot cover: hold on to the screw as you remove it so it doesn't fall into the computer. Lift out the slot cover.



Keep the screw to secure the option card to the computer. Store the slot cover in a safe place in case you remove the option card later.

4. Unpack the option card and adjust any switches or jumpers on it, if necessary. (Check the option card instructions.) When you handle the card, be careful not to touch any of the components on the circuit board, especially the gold-edged connector pins. If you need to set it down before you install it, place it gently on top of its original packing material with the component side facing up. Keep the packing materials in case you remove the card later.

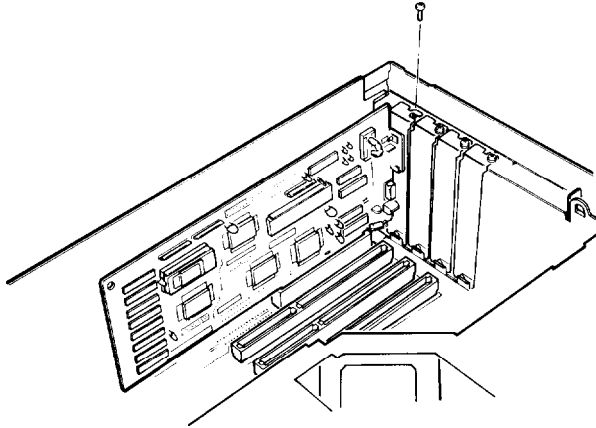
5. Grip the card firmly by the top corners and position it at the top of the slot, as shown below. Make sure the connector pins point down and the component side faces the power supply inside the computer.



6. Insert the card into the slot, guiding it straight down. Once the connector pins reach the connector slot, push the card downward firmly (but carefully) to insert it fully. You should feel the card fit into place.

If the card does not go in smoothly, do not force it; pull it all the way out and try again, keeping it straight as you insert it. Examine the card to verify that it is fully seated in the slot along the length of the connector.

7. Secure the end of the card to the back of the computer with the retaining screw.



8. Follow the instructions at the end of this chapter to replace the cover. Then see “Post-installation Setup” following that section.

Removing an Option Card

If you need to remove an option card, follow these steps:

1. First, remove the cover from the computer. See page 5-2 for instructions.
2. Remove the screw securing the card to the back of the computer and pull it straight up and out of the slot. Either set the card aside by placing it gently on a soft surface with the component side facing up or carefully wrap the card, preferably with the original packing materials, and place it inside its box for safe storage.
3. Cover the end of the empty option slot with the original metal cover and secure it with the retaining screw.

4. If you are removing an option card that controls a mouse, you need to change the settings of jumpers JP10 and JP11 on the main system board. If you are removing a display adapter card you may need to change the settings of jumpers JP12 and JP14. See page 5-6 for instructions.
5. Replace the cover. See page 5-30 for instructions.

Adding Memory Modules

Your computer comes with 2MB of memory. By installing SIMMs (single inline memory modules) on the main system board, you can increase the amount of memory in your computer up to 16MB.

Caution

It is best to have your dealer install memory modules for you because they can be damaged easily if installed incorrectly. If you prefer, you can install your own SIMMs by carefully following the instructions in this section. However, you could transmit an electrostatic discharge and damage your components; so read this entire section before you begin.

Before you install SIMMs, check the following guidelines to ensure that they will work properly:

- Use SIMMs that operate at 70ns (nanosecond) access speed. Be sure all the SIMMs have the same access speed.
- Use the correct SIMM configuration to add the amount of memory you want. See the table on the next page.

Once you have the SIMMs you need, you or your dealer can install them in your computer. If you are going to install them yourself, follow the instructions below.

Installing Memory Modules

There are 16 SIMM sockets on the main system board organized in four banks consisting of four sockets each. Each socket can contain one memory module.

You must fill the sockets in any bank you use. Since each bank has four sockets, you must install four SIMMs to fill up the bank.

The following table shows all the possible SIMM configurations for the Equity 386/25 PLUS. Do not install SIMMs in any other configuration. Keep in mind that eight 256KB SIMMs (2MB) are already installed in banks 0 and 1.

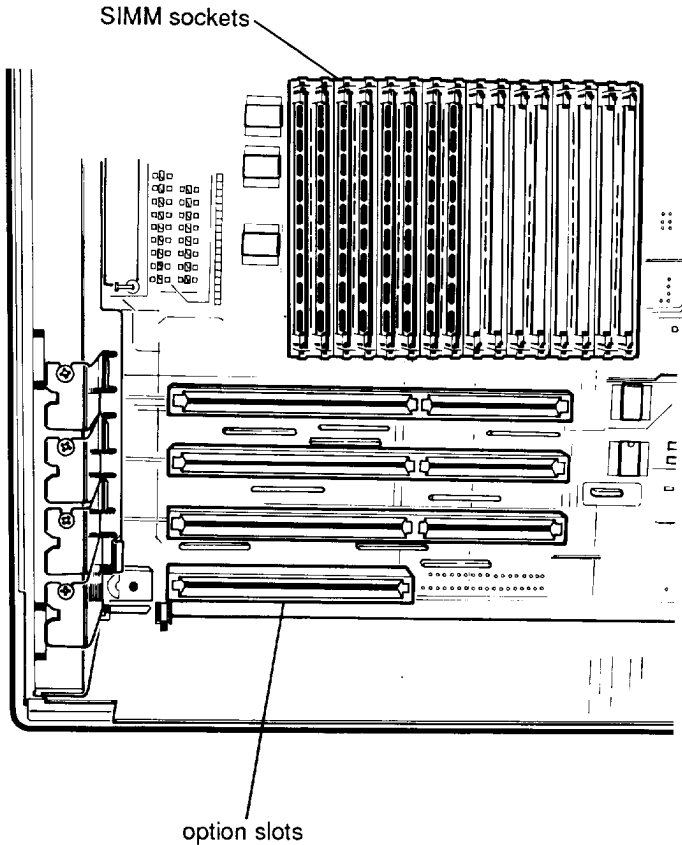
SIMM configurations for the Equity 386/25 PLUS

Bank 0	Bank 1	Bank 2	Bank 3	Total memory
K K K K	— — — —	— — — —	— — — —	1MB
K K K K	K K K K	— — — —	— — — —	2MB
K K K K	K K K K	K K K K	— — — —	3MB
K K K K	K K K K	K K K K	K K K K	4MB or 4MB
M M M M	— — — —	— — — —	— — — —	
K K K K	K K K K	M M M M	— — — —	6MB
M M M M	M M M M	— — — —	— — — —	8MB
M M M M	M M M M	K K K K	— — — —	9MB
K K K K	K K K K	M M M M	M M M M	10MB or 10MB
M M M M	M M M M	K K K K	K K K K	
M M M M	M M M M	M M M M	— — — —	12MB
M M M M	M M M M	M M M M	M M M M	16MB

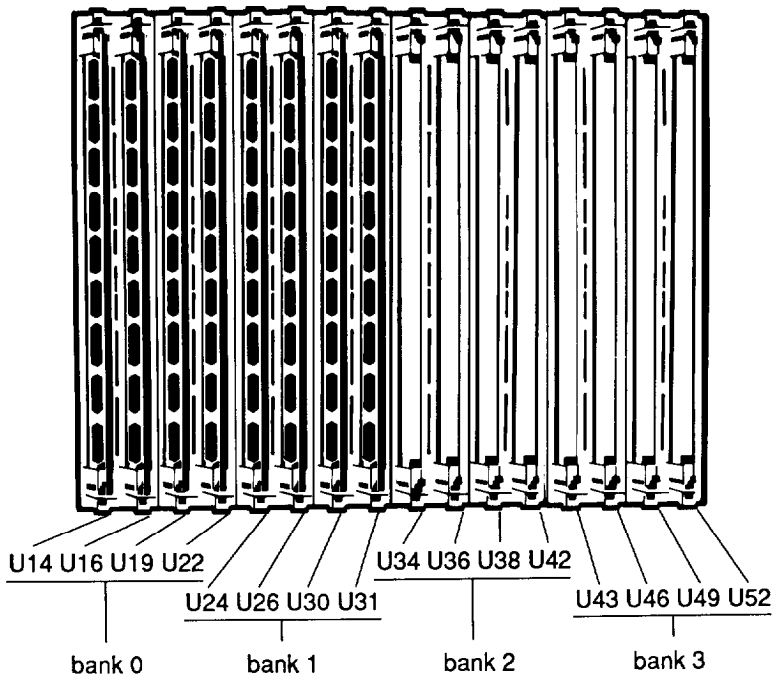
K = 256KB SIMM installed
M = 1MB SIMM installed
— = No SIMM installed

Once you have determined where to add the memory modules, follow these steps to install them:

1. Remove the computer's cover. See page 5-2 for instructions.
2. Turn the computer so that the back panel faces left and the front panel faces right. The SIMM sockets are located on the main system board just above the option slots, as shown below.

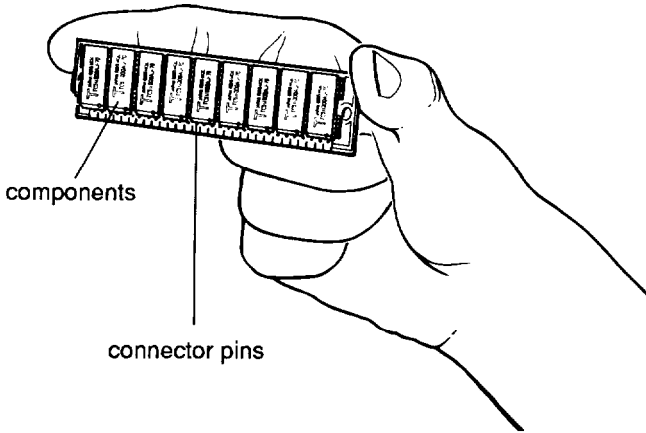


The sockets are labelled vertically as shown below.

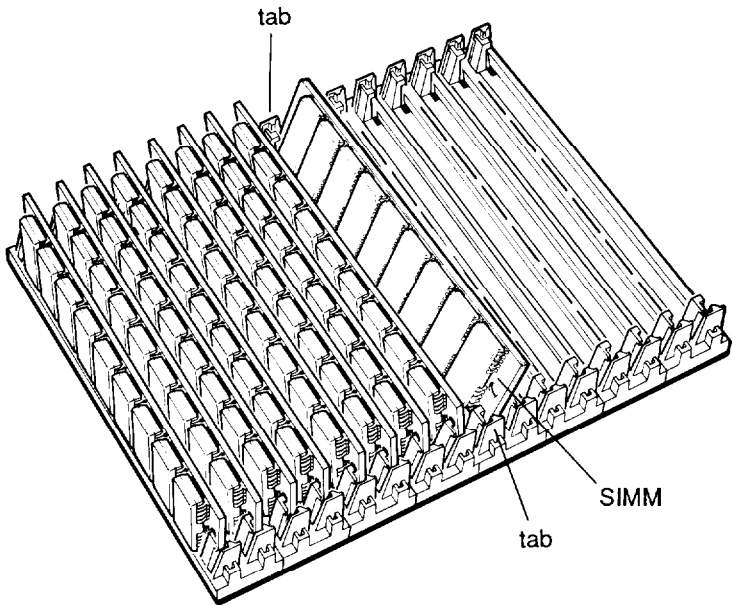


3. If an option card is blocking access to the SIMM sockets, follow the steps on page 5-15 to remove the card(s).

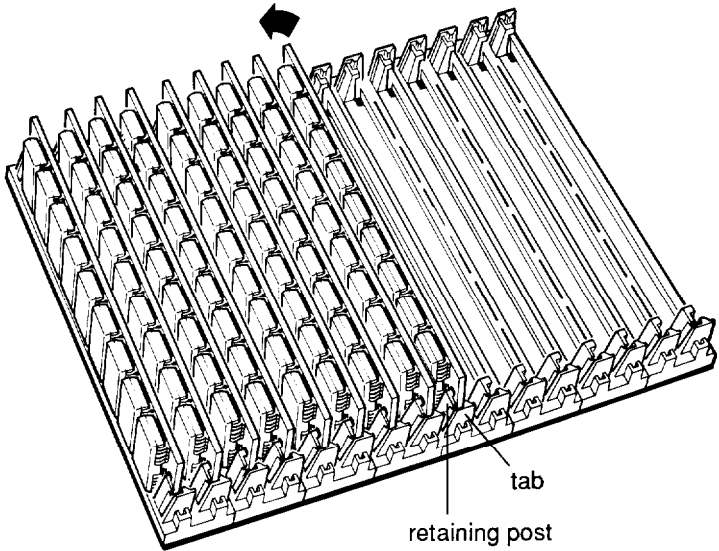
4. Hold the SIMM so the component side is facing to the left and the metal connector pins are facing down.



5. To insert the SIMM in the socket, place it on the right side of the tabs at an angle, as shown below.



6. Gently push down on the SIMM and, at the same time, turn the top of the SIMM to the left until it is vertical and snaps into place between the tabs and the retaining posts.



If the SIMM does not go in smoothly, do not force it; pull it all the way out and try again.

Make sure the SIMM is fully inserted into the socket and that the pins on the retaining posts protrude through the holes in both ends.

7. Repeat steps 5 and 6 for each SIMM you want to install.
8. Set the appropriate jumpers to indicate the amount of memory you have on SIMMs. See “Changing the Jumper Settings” on page 5-6 for instructions.
9. Replace any option card(s) you may have removed to access the SIMM sockets. See “Installing an Option Card” on page 5-10 for instructions.

10. Follow the steps on page 5-30 to replace the computer's cover. Then see "Post-installation Setup" (following that section) for instructions on configuring your computer for use with your new memory.

Removing Memory Modules

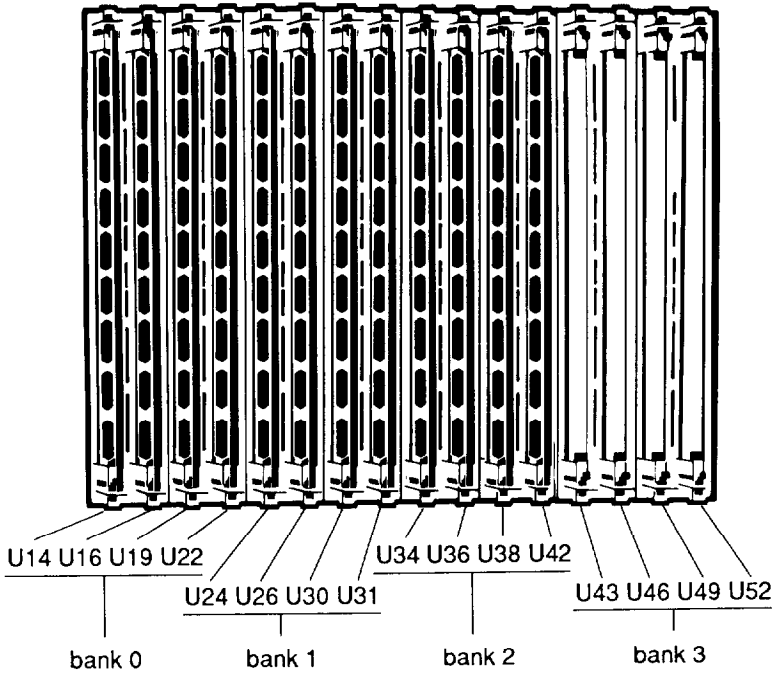
If you need to remove memory modules from your computer, have your dealer do it for you or follow the steps below. If you remove them yourself, check the table on page 5-17 to be sure you remove SIMMs from the correct sockets.

Caution

It is safer to have your dealer remove SIMMs for you since there is a danger of transmitting an electrostatic discharge and damaging your components.

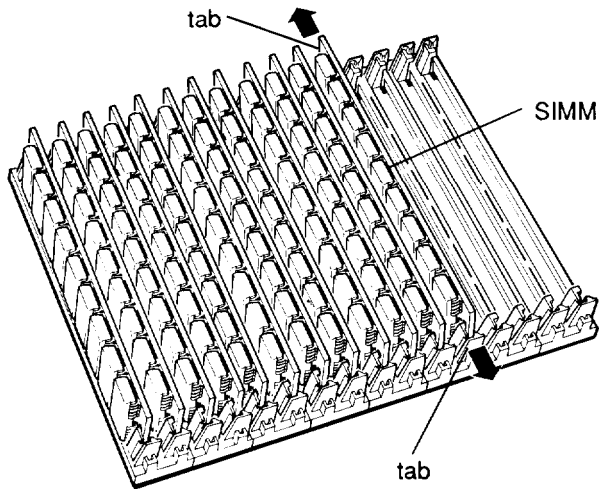
1. Remove the cover. See page 5-2 for instructions.
2. Turn the computer so the back panel faces left and the front panel faces right. The SIMM sockets are located on the main system board above the option slots, as shown below.

The SIMM sockets are labelled vertically as shown below.

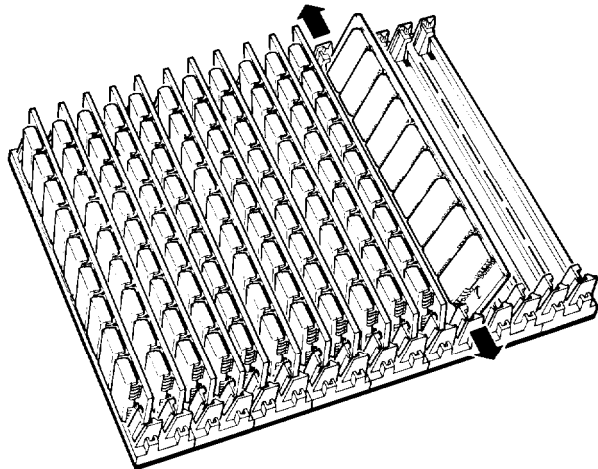


3. If an option card is blocking access to the SIMM sockets, follow the steps on page 5-15 to remove it.

4. Use your fingers or two small screwdrivers to pull away the tabs that secure the SIMM at each end. Be careful not to pull the tabs too far, or they may break.



As you pull away the tabs, the SIMM falls to the right at an angle.



When the SIMM is at an angle, release the tabs and carefully remove it from the socket.

5. Repeat step 4 for each SIMM you need to remove.
6. Set the appropriate jumpers to indicate the amount of memory you now have on SIMMs. See “Changing the Jumper Settings” on page 5-6 for instructions.
7. Replace any option card(s) you may have removed to access the SIMM sockets. See “Installing an Option Card” on page 5-10 for instructions.
8. Follow the steps on page 5-30 to replace the computer’s cover. Then see “Post-installation Setup” (following that section) for instructions on configuring your computer for use with your decreased memory.

Installing a Math Coprocessor

Your computer has a socket on the main system board to accommodate either an Intel 80387 (25MHz) or a Weitek 3167 (25MHz) math coprocessor. You can install both if you first install a Weitek dual-coprocessor adapter in the socket.

A math coprocessor speeds up the numeric calculations your computer performs when using certain application software. It also increases the speed at which graphic images are displayed on your monitor when you use graphics-oriented software.

It is best to have your dealer install a math coprocessor for you, since it is a delicate component that can be damaged easily if it is installed incorrectly.

If you install it yourself, be sure to read the manual that came with your math coprocessor, if you received one. Then follow the steps in this section to install it in your computer. However, be sure to read all of the warnings and instructions carefully so you do not injure yourself or damage the coprocessor or your computer.

Caution

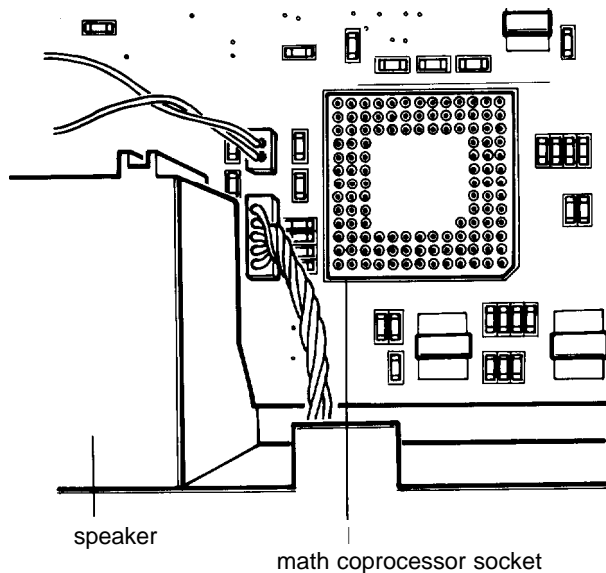
To avoid generating static electricity and damaging your math coprocessor, remain stationary as you install it.

These instructions describe how to install the Intel 80387 math coprocessor. To install the Weitek 3167 or the dual-coprocessor adapter, see the documentation that came with your equipment.

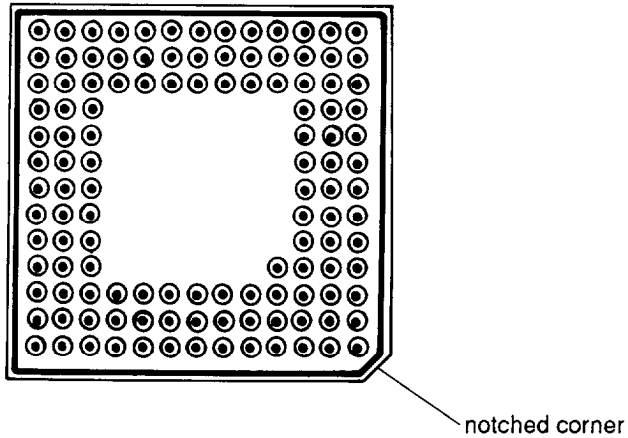
Carefully follow these steps to install a math coprocessor:

1. Remove the computer's cover. See page 5-2 for instructions.
2. Remove the math coprocessor from its package and set it aside.
3. Turn the computer so the front panel is facing you.

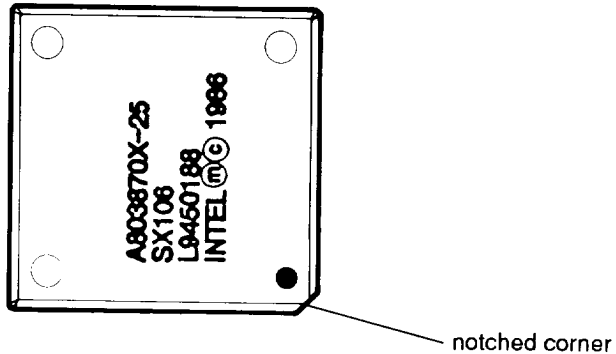
The math coprocessor socket is located on the main system board to the right of the speaker, as shown below.



4. If an option card is blocking access to the math coprocessor socket, follow the steps on page 5-15 to remove it.
5. The math coprocessor socket is square and has three rows of pins on each side. The 80387 coprocessor fits into the inner two rows of pins. (The Weitek coprocessor or adapter fits into all three rows.) The lower right corner of the socket is notched, as shown in the next illustration.



There is also a notched corner on the math coprocessor, as shown below.

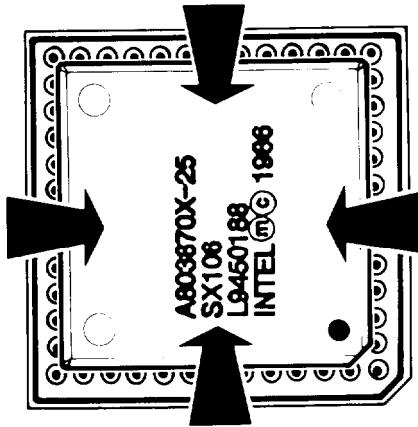


Align the notched corner of the coprocessor with the notched corner of its socket. The notched corners must be aligned for the coprocessor to fit into the socket, so be sure the alignment is correct before you proceed to the next step.

Caution

If you insert the math coprocessor in the wrong position, you could permanently damage it.

6. Line up the pins on the coprocessor with the inner two rows of holes in the socket. You should feel the pins drop into the holes when they are aligned properly.
7. Gently push the coprocessor into the socket, pressing evenly on all sides of the coprocessor, as shown below.



If the coprocessor does not go in smoothly, do not force it; pull it all the way out and try again, keeping it straight as you insert it.

Examine the coprocessor to be sure it is inserted all the way into the socket.

8. Follow the steps on page 5-30 to replace the computer's cover. Then see "Post-installation Setup," following that section, for instructions on configuring your computer for use with your math coprocessor.

Removing a Math Coprocessor

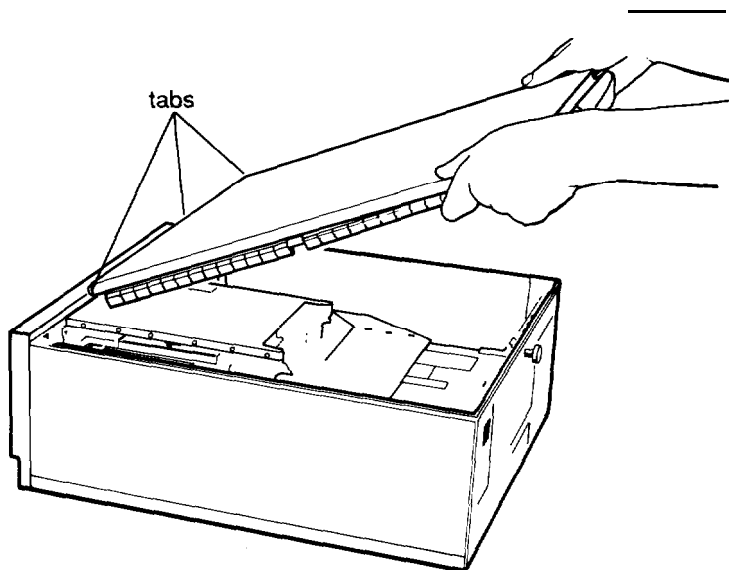
If you need to remove a math coprocessor from your computer, contact your dealer for assistance. You need a special extracting tool to remove the coprocessor without damaging it. Do not attempt to remove it without this tool because you can easily damage it.

After you remove the coprocessor, run the Setup program on your Reference diskette to configure your system for use without it. See Chapter 2 for instructions.

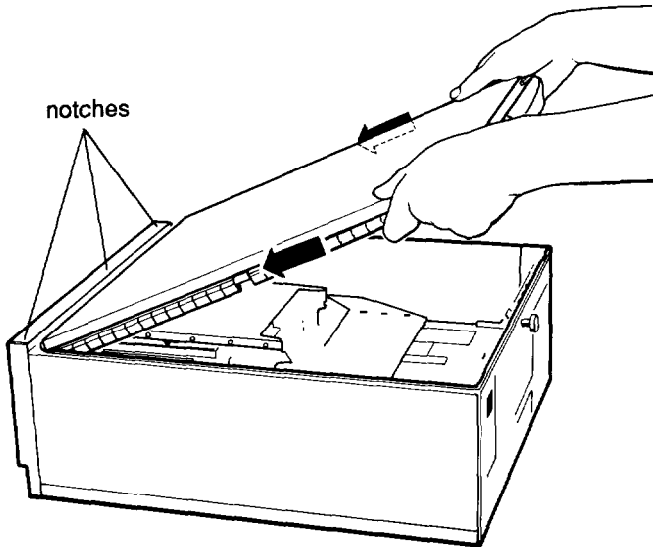
Replacing the Cover

After you install (or remove) optional equipment or change the jumper settings, follow these steps to replace the computer's cover:

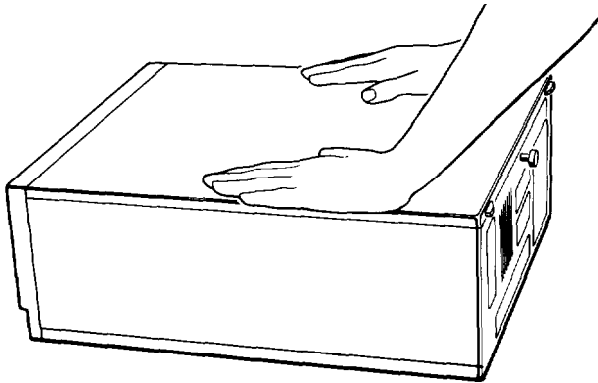
1. Facing the back of the computer, hold the cover so that the side with three tabs on the edge faces away from you, as shown below.



2. Insert the three tabs into the three notches in the back of the front panel of the computer.



3. Lower the back of the cover onto the computer and press down firmly on all edges of the cover to form a tight seal.



4. Turn the large screw on the back panel clockwise to secure the cover to the computer.

5. Reconnect the computer to the monitor, printer, keyboard, and any other peripherals you have.
6. Reconnect the power cable to the back of the computer and to an electrical outlet.

Post-installation Setup

After you install or remove a math coprocessor or memory modules, you need to run the Setup program on your Reference diskette so it can automatically update the computer's configuration information. If you install or remove any other type of option, such as an option card or a disk drive, you must run Setup to update your settings. For example, if you add a hard disk drive, you need to let the computer know the type of drive you have installed. See Chapter 2 for instructions.

Note

If you installed additional extended memory and want to use any of it as expanded memory, see "Using Expanded Memory Beyond 640KB" in Chapter 4 for more information.

If you install a hard disk drive that has never received a hardware level format (such as some non-Epson hard disk drives), you need to format the disk. Check the manual that came with your drive, and then, if necessary, follow the instructions in Appendix C to format your new hard disk.

If you have added a hard disk drive and you want to load MS-DOS or another operating system from that drive, you need to install the operating system on it. See your MS-DOS Installation Guide or the documentation that came with your operating system for instructions.

If you install a memory option card, use the setup program that came with it to configure the computer for use with the card. See your memory card manual for instructions.

Additionally, you may need to add some commands in your configuration files. See your MS-DOS Reference Manual and the manual that comes with your option card for instructions.

You may also want to test a newly-installed option. Some options come with their own diagnostics test programs, and you can test others with the diagnostics programs on your Reference diskette. You can use the System diagnostics program on your Reference diskette to test the following:

- System memory
- Math coprocessor
- Serial and parallel ports
- Disk drives
- Monitors and display adapters
- Dot-matrix printers.

See Appendix E for instructions.

Appendix A

Using the VGA Utilities

Your computer has a Video Graphics Array (VGA) adapter built into the main system board which is 100% compatible with IBM VGA. This adapter allows you to use the computer with Epson VGA monitors, other brands of VGA monitors, and VGA compatible, multi-frequency monitors that use analog input (in non-interlaced mode only). The internal VGA is supported by the Chips and Technologies® SuperVGA 82C452 controller.

In addition to its VGA support, the controller offers a large set of extended functions and higher resolutions, which you can use if you have a multi-frequency monitor capable of displaying these resolutions. The built-in adapter's capabilities include:

- High-speed video memory interface
- 16-bit datapath to video memory and hardware registers
- Resolutions of 800 x 600 or 1024 x 768 in graphics modes with 16 colors
- Resolutions up to 640 x 480 in graphics modes with 256 colors
- 132-column text mode in 16 colors
- Graphics cursor movements performed by the video adapter controller.

The Epson standard VGA monitor uses VGA modes in resolutions up to 640 x 480 and does not need any software drivers to operate properly. You need to install software drivers only if you want to use extended VGA modes (in resolutions up to 800 x 600) or super-extended VGA modes (in resolutions up to 1024 x 768) on a multi-frequency monitor.

Note

These utilities are intended for use only with the computer's built-in VGA adapter. If you have installed a video card in one of the computer's option slots, use the documentation and software that came with it. For further information on using the computer with a video card, see "Using a Display Adapter Card" in Chapter 1.

This appendix describes the installation and operation of the software drivers and utility programs on the Utility diskettes that came with your computer. If you have a high-resolution, multi-frequency monitor, extended graphics support is available for these applications:

- Microsoft Windows/286™
- Microsoft Windows/386
- Microsoft Windows,™ Version 3.0
- Microsoft/IBM OS/2 Presentation Manager™
- Microsoft Word
- Autodesk®AutoCAD®
- Digital Research®GEM®
- Ventura Publisher®
- Lotus 1-2-3 and Lotus Symphony®
- Ashton-Tate® Framework® II
- WordStar
- WordPerfect
- VersaCAD™ Design

- CADVANCE™
- OrCAD™
- Generic™ CADD Level 3
- VESA Driver.

Note

To use the graphics display drivers in resolutions of 800 x 600 or 1024 x 768, you must have a multi-frequency monitor capable of displaying these resolutions. Standard VGA monitors do not have this capability.

Besides the software drivers listed above, the Utility diskettes also include the following utility programs:

- o VGAMODE
- o SETVGA
- o MODETEST
- o WS33INST
- o SNOOZE.

Note

You may want to use the SETVGA, MODETEST, and SNOOZE utilities even if you are not installing any of the VGA device drivers. See page A-57 for more information.

Preparing to Install Drivers or Utilities

Before you install any of the drivers or utilities on the Utility diskettes, follow these precautions:

- ❑ Make backup copies of the Utility diskettes using the DISKCOPY command or the Epson MENU utility. (See your MS-DOS Reference Manual for instructions.) Store the original diskettes in a safe place and use your backup copies to install the software drivers and utilities on your hard disk.
- ❑ Each of the drivers on your Utility diskettes is designed for a specific version of software and will not work properly on other versions of the same software. (The Utility diskettes contain drivers for several versions of some programs.) Verify that the software driver you install is the appropriate driver for the software version you are using.
- ❑ Read the section in this appendix that describes the driver installation for the particular application program you are using. Be sure to follow any special instructions given in each section. When you are instructed to copy the driver files to your hard disk, see “Using the VGA Driver Setup Program,” below.

Using the VGA Driver Setup Program

The VGA driver setup program on your Utility 1 diskette provides an easy way to install the VGA drivers on your hard disk. You choose drivers for each application program from the main menu and select each resolution you want to use from a submenu. Then Setup copies the necessary driver files to your hard disk and displays further instructions for configuring each program.

Follow these steps to use the VGA driver setup program:

1. Insert the Utility 1 diskette in drive A.
2. Type A : and press **Enter** to log onto drive A.
3. At the A> prompt, type the following and press **Enter**:

```
Setup
```

You see the following:

```
Display Application Drivers for  
SuperVGA 82C452  
  
<<< Press any key to continue >>>
```

4. Press any key. You see the main Setup menu. The menu lists the application programs for which VGA drivers are available, such as those shown below.

```
Select any Application Driver to install  
  
Microsoft Windows/286 Version 2.11  
Microsoft Windows/386 Version 2.11  
Microsoft Windows Version 3.0  
Microsoft Presentation Manager V1.1 (16 color)  
  
Utility programs
```

5. Press **↑** or **↓** to highlight the program driver you want to install.

Be sure to select the appropriate driver for the version of software you are using. The driver will not work properly with other versions of the same software.

6. Press **Enter** to select the program. (To exit Setup and return to MS-DOS, press **Esc**.) You see a list of the display resolutions available for the program, such as the following:

Microsoft Windows/386 Version 2.11
Resolution = 640X480, Color = 256
Resolution = 640X400, Color = 256
Resolution = 1024X768, Color = 16
Resolution = 800X600, Color = 16
Resolution = 640X480, Color = 16
↑↓ = move cursor up\down, ENTER = toggle selection ESC = exit to main menu, END = start to install

7. Press **↑** or **↓** to highlight the resolution(s) you want to copy to your hard disk and press **Enter**. The word **selected** appears beside the resolution. You can copy as many resolutions as you want; just highlight each one and press **Enter**.
8. Once you have selected all of the resolutions you want, press **End** to begin copying them.

If you want to cancel your selections and return to the main menu, press **ESC**.

Before Setup copies the files, it asks for the pathname on the hard disk where you want to install the driver files. A suggested pathname is offered, such as the one shown below.

Enter the [driver:path] for installation [C:\WIN386]

Many of the drivers require a specific pathname to operate properly. See the instructions given in this appendix for each application program you want to install before you enter a pathname.

9. To select the default pathname, press **Enter**. To change it, use **Backspace** to erase the default pathname and type a new one. Then press **Enter**.

If the directory you chose already exists on the hard disk, Setup begins to copy the files. If not, you see a prompt such as the following:

```
Create path [C:\WIN386] (Y/N) ?
```

10. If you want Setup to create the directory for you, press **Y**. To exit to the main menu, press **N**. If the driver files are not on the Utility diskette currently in drive A, Setup displays a message such as the following:

```
Insert Driver Disk #2  
Press any key when it is ready
```

11. Insert the appropriate Utility diskette and press any key. Setup begins copying all the driver files for the resolution(s) you selected. You see the name of each file flash on screen as it is copied.

If any of the files already exist in the directory, you see a message such as the following:

```
C:\WIN386\WIN3K480.3EX already  
exists !  
Overwrite this file ? (Y/N)
```

12. To continue copying the file (and overwrite the existing one with that name), press **Y**. Setup copies the new file to the hard disk and proceeds to the next file, if there is one.

To keep the original version of the file, press **N**. The new file is not copied and Setup proceeds to the next file.

13. When all of the files are copied, you see a message giving further instructions and referring you to your User's Guide for more details. You can either hold down the **Shift** key and press the **Print Screen** key to print the screen text or write down the instructions. Then press any key to continue. You see the main menu.

14. At the main menu, you can return to step 5 to select another driver or press **ESC** to exit the setup program.

See the instructions in this appendix that apply to the application program driver(s) you installed for further instructions.

Microsoft Windows/286, Versions 2.03, 2.10, and 2.11

You can use the Windows/286 drivers with the Windows/286 program itself or with any of the run-time modules of Windows available with Microsoft Excel, Aldus PageMaker? and Adobe Illustrator? among other programs. The Windows/286 drivers support the following resolutions:

- 640 x 480, 16-color graphics
- 800 x 600, 16-color graphics
- 1024 x 768, 16-color graphics
- 640 x 400, 256-color graphics
- 640 x 480, 256-color graphics.

Installing the Drivers

If you have already installed Windows/286 you must reinstall it along with the new driver. Follow these steps:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Windows/286 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, you can accept the default pathname or enter a different one.

2. Use the instructions in the Windows/286 documentation and on your screen to run the Windows/286 setup program.
3. The program displays a list that includes the display adapter, keyboard type, and mouse that it has detected in your computer. Press 1 to highlight `VGA` and press **Enter**.
4. The program shows a list of display adapters. Press 1 to highlight `Other` and press **Enter**.
5. Then Setup asks you for the name of the drive and directory containing the Windows/286 display drivers. Type the pathname you selected when you ran the VGA Driver Setup program and press **Enter**.
6. The setup program asks you to choose a display driver resolution. Select the driver you want to use and press **Enter**. (Be sure that you copied a driver for that resolution to your hard disk.)
7. Follow the rest of the instructions on the screen and in the Windows/286 documentation to complete the installation procedure.

Microsoft Windows/386, Versions 2.03, 2.10, and 2.11

The following resolutions are available for Windows/386:

- 640 x 480, 16-color graphics
- 800 x 600, 16-color graphics
- 1024 x 768, 16-color graphics
- 640 x 400, 256-color graphics
- 640 x 480, 256-color graphics.

Installing the Drivers

If you have already installed Windows/386, you must reinstall it along with the new driver. Follow these steps:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Windows/386 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, you can accept the default pathname or enter a different one.

2. Use the instructions in the Windows/386 documentation and on your screen to run the Windows/386 setup program.
3. When the Windows/386 setup program asks you to select the computer you are using, choose the following:

COMPAQ 80386-Based Personal
Computers and Compatibles

4. Then the program displays a list that includes the display adapter, keyboard type, and mouse that it has detected in your computer. Press 1 to highlight VGA and press **Enter**.
5. The program shows a list of display adapters. Press 1 to highlight Other and press **Enter**.
6. Then Setup asks you for the name of the drive and directory containing the Windows/386 display drivers. Type the pathname you selected when you ran the VGA Driver Setup program and press **Enter**.
7. The setup program asks you to choose a display driver resolution. Select the driver you want to use and press **Enter**. (Be sure that you copied a driver for that resolution to your hard disk.)
8. Follow the rest of the instructions on the screen and in the Windows/386 documentation to complete the installation.

Microsoft Windows, Version 3.0

The following resolutions are available for Windows 3.0:

- 640 x 480, 16-color graphics (W3L480.DRV)
- 800 x 600, 16-color graphics (W3L600.DRV)
- 1024 x 768, 16-color graphics (W3L768.DRV)
- 640 x 400, 256-color graphics (W3P400.DRV)
- 640 x 480, 256-color graphics (W3P480.DRV).

Installing the Drivers

Follow these steps to install the Windows 3.0 drivers:

1. If you have not yet installed Windows 3.0, install the program on your hard disk. Follow the instructions in your Windows 3.0 documentation.
2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Windows 3.0 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the name of the directory containing your Windows 3.0 driver files (probably C: \ WINDOWS \ SYSTEM).

3. Log onto your Windows 3.0 driver directory.
4. Copy the driver file you just installed and name the new file VGA.DRV to overwrite the old VGA.DRV file. The names of the driver files are listed at the beginning of this section.

For example, if you want to use the 1024 x 768, 16-color driver, type the following and press **Enter**:

```
COPY W3L768.DRV VGA.DRV
```

5. Now log onto your main Windows 3.0 directory.
6. Type **SETUP** and press **Enter** to run the Windows 3.0 setup program. (Use the instructions in the Windows 3.0 documentation and on your screen to run the program.)
7. The System Information screen shows the system configuration it has detected in your computer. Select **Display** and press **Enter**.

8. You see a list of available drivers. Select the `Chips` display driver in the resolution you want to use and press **Enter**.
9. You see the System Information display again. Press **Enter**.
10. Setup asks for the pathname to the directory containing your Windows 3.0 driver files. Type the pathname and press **Enter**.
11. Follow the rest of the instructions on the screen and in the Windows 3.0 documentation to complete the installation.

Microsoft/IBM OS/2 Presentation Manager, Versions 1.1 and 1.2

The following resolutions are available for Presentation Manager:

Version 1.1:

- 640 x 480,16color graphics (VGA480.DLL)
- 800 x 600,16color graphics (VGA600.DLL)
- 1024 x 768, 16-color graphics (VGA768.DLL)
- 640 x 400,256-color graphics (VGA400PP.DLL)
- 640 x 480,256-color graphics (VGA480PP.DLL).

Version 1.2:

- 640 x 480,16-color graphics (VGAH480.DLL)
- 800 x 600,16-color graphics (VGAH600.DLL)
- 1024 x 768, 16-color graphics (VGAH768.DLL).

Installing the Drivers

To install the drivers, follow the steps below:

1. If you have not installed OS/2 1.1, follow the instructions in your OS/2 manual to install it. Configure OS/2 for a standard VGA driver.
2. Reset the computer and verify that OS/2 and Presentation Manager are operating properly.
3. If you are running Presentation Manager, exit from it.
4. Run the VGA Driver Setup program on your Utility 1 diskette to copy the appropriate Presentation Manager drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, enter the following:

```
C:\VGA
```

5. Remove the Utility diskette from drive A.
6. Type `C:\VGA` and press **Enter** to log onto the VGA directory on your hard disk drive.
7. Type `DIR` and press **Enter** to display a list of the driver files you copied to the VGA directory. If you copied all of the 16-color and 256-color graphics drivers to this directory, you see all of the files (listed at the beginning of this section in parentheses beside the resolutions they control).
8. Copy the desired driver file to the VGA directory using the filename `VGA.DLL`. For example, to copy the 1024 x 768, 16-color graphics driver, type the following and press **Enter**:

```
COPY VGA768.DLL VGA.DLL
```

9. Now copy the same driver file again and name this copy DISPLAY.DLL, as in the following example:

```
COPY VGA768.DLL DISPLAY.DLL
```

10. Log onto the root directory. (Type CD\ and press **Enter**.)

11. Type the following and press **Enter**:

```
COPY CONFIG.SYS+CON CONFIG.SYS
```

12. Type the following and press **Enter**:

```
LIBPATH=C:\VGA
```

13. Press F6 and then **Enter**.

14. Hold down **Ctrl** and **Alt** and press **Del** to reset the computer.

Microsoft Word, Version 5.0

The following resolutions are available for Word 5.0:

- 800 x 600, 16-color graphics (VGA600.VID)
- 1024 x 768, 16-color graphics (VGA 768.VID).

Installing the Drivers

If you have not already installed Microsoft Word 5.0 on your computer, follow the steps in your Word documentation to install it. Then follow these instructions to install the drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Word 5.0 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your Word 5.0 program files.

2. Log onto your Word 5.0 directory.
3. Identify the name of the driver file for the resolution you want to use in the list at the beginning of this section. Rename that driver file to the name SCREEN.VID. For example, if you want to use the 1024 x 768,16-color graphics driver, type the following and press **Enter**:

```
REN VGA768.VID SCREEN.VID
```

Autodesk AutoCAD, Version 2.62

The AutoCAD drivers conform to the Autodesk Device Interface (ADI) for rendering and display drivers. Epson provides the following resolutions for AutoCAD 2.62:

- 640 x 480, 16-color graphics (D2V1480.EXE)
- 800 x 600, 16-color graphics (D2V1600.EXE)
- 1024 x 768, 16-color graphics (D2V1768.EXE).

Installing the Drivers

Use the instructions in your AutoCAD documentation to install the program on your hard disk. To install the drivers, follow the steps below:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the AutoCAD 2.62 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your AutoCAD 2.62 program files.

2. Before running AutoCAD, you must load the display driver into the computer's memory. First, log onto your AutoCAD directory. Then type the display driver filename at the MS-DOS command prompt and press **Enter**. (The display driver filenames are listed at the beginning of this section.) For example, to load the 1024 x 768, 16-color graphics driver into memory, type the following and press **Enter**:

```
D2V1768
```

Installing the driver in the AUTOEXEC.BAT file

You can install the driver automatically each time you turn on or reset your computer by placing the command in your AUTOEXECBAT file. Follow these steps:

1. Type `C : \` and press **Enter** to log onto the root directory of your hard disk.
2. Type the following and press **Enter**:

```
COPY AUTOEXEC.BAT+CON AUTOEXEC.BAT
```

3. Type the driver name (such as `D2V17 68`) and press **Enter**.
4. Press **F6** and then **Enter**.

Configuring AutoCAD

The first time you use AutoCAD with the driver, you need to configure it for an ADI display. Follow the steps below:

1. Select **Configure AutoCAD** from the AutoCAD main menu.

2. When the program displays the current configuration (if any), select `Configure video display`.
3. Select ADI as your new driver. (The menu indicates that this is installed at interrupt 7A hex.)
4. Save the new configuration and return to the main menu.

Autodesk AutoCAD, Version 9.00

The AutoCAD drivers conform to the Autodesk Device Interface (ADI) for rendering and display drivers. Epson provides the following resolutions for AutoCAD 9.0:

- 640 x 480, 16-color graphics (R3V1480.EXE)
- 800 x 600, 16-color graphics (R3V1600.EXE)
- 1024 x 768, 16-color graphics (R3V1768.EXE).

Installing the Drivers

Use the instructions in your AutoCAD documentation to install the program on your hard disk. To install the drivers, follow the steps below:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the AutoCAD 9.0 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your AutoCAD 9.0 program files.

2. Before running AutoCAD or AutoShade, you must load the display driver into the computer's memory. First, log onto your AutoCAD directory, if necessary. Then type the display driver filename at the MS-DOS prompt and press **Enter**. (The display driver filenames are listed at the beginning of this section.)

For example, to load the 1024 x 768, 16-color graphics driver into memory, type the following and press **Enter**:

R3V1768

Installing the driver in the AUTOEXEC.BAT file

You can install the driver automatically each time you turn on or reset your computer by placing the command in your AUTOEXEC.BAT file. Follow these steps:

1. Type `C : \` and press **Enter** to log onto the root directory of your hard disk.
2. Type the following and press **Enter**:

```
COPY AUTOEXEC.BAT+CON AUTOEXEC.BAT
```

3. Type the driver name (such as `R3V17 68`) and press **Enter**.
4. Press **F6** and then **Enter**.

Configuring AutoCAD

The first time you use AutoCAD with the driver, you need to configure it for an ADI display. Follow the steps below:

1. Select `Configure AutoCAD` from the AutoCAD main menu.
2. When the program displays the current configuration (if any), select `Configure video display`.

3. Select ADI as your new driver. (The menu indicates that this is installed at interrupt 7A hex.)
4. Save the new configuration and return to the main menu.

Configuring AutoShade

If you have AutoShade, the first time you use it with the driver, you need to configure it for an ADI display. Follow these steps:

1. Delete the file SHADE.CFG from the AutoCAD directory on your hard disk.
2. Start AutoShade.
3. The program asks for a display and rendering driver. Select ADI for both drivers and indicate that you have a dual display system.
4. When you exit from the AutoShade program, it creates a new SHADE.CFG file.

Autodesk AutoCAD, Version 10.0

The AutoCAD drivers conform to the Autodesk Device Interface (ADI) for rendering and display drivers. The following resolutions are available:

- 640 x 480, 16-color graphics (R4V1480.EXE)
- 800 x 600, 16-color graphics (R4V1600.EXE)
- 1024 x 768, 16-color graphics (R4V1768.EXE)
- 640 x 400, 256-color graphics (R4V2400.EXE)
- 640 x 480, 256-color graphics (R4V2480.EXE).

Installing the Drivers

Use the instructions in your AutoCAD documentation to install the program on your hard disk. To install the drivers, follow the steps below:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the AutoCAD 10.0 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your AutoCAD 10.0 program files.

2. Prior to starting an AutoCAD or AutoShade session, you must load the display driver into the computer’s memory. First, log onto your AutoCAD directory, if necessary. Then type the display driver filename at the MS-DOS prompt and press **Enter**. (The display driver filenames are listed at the beginning of this section.)

For example, to load the 1024 x 768, 16-color graphics driver, type the following and press **Enter**:

```
R4V1768
```

Note

If you are using two monitors with your system, include the -D option on the command line. For example, to load the 1024 x 768 driver in a dual-monitor configuration, type the following and press **Enter**:

```
R4V1768 -D
```

Installing the driver in the AUTOEXEC.BAT file

You can install the driver automatically each time you turn on or reset your computer by placing the command in your AUTOEXEC.BAT file. Follow these steps:

1. Type `C : \` and press **Enter** to log onto the root directory of your hard disk.
2. Type the following and press **Enter**:

```
COPY AUTOEXEC.BAT+CON AUTOEXEC.BAT
```

3. Type the name of the driver (such as R4V17 68) and press **Enter**.
4. Press **F6** and then **Enter**.

Configuring AutoCAD

The first time you use AutoCAD with the driver, you need to configure it for an ADI display.

1. Select **Configure AutoCAD** from the main menu.
2. After you see the current configuration (if any), select **Configure video display**.
3. Select **ADI display v4.0** as your new driver. (The menu indicates that this is installed at interrupt 7A hex.)
4. Save the new configuration and return to the main menu.

Configuring AutoShade

If you have AutoShade, the first time you use it with the driver, you need to configure it for an ADI display. Follow these steps:

1. Delete the file SHADE.CFG from the AutoCAD directory on your hard disk.
2. Start AutoShade.
3. The program asks for a display and rendering driver. Select AD 1 for both drivers and indicate that you have a dual display system.
4. When you exit from the AutoShade program, it creates a new SHADE.CFG file.

Autodesk AutoCAD 386, Version 10.0

The AutoCAD 386 drivers conform to the Autodesk Device Interface (ADI) for rendering and display drivers. The following resolutions are available:

- 800 x 600, 16-color graphics (VGA600.EXP)
- 1024 x 768, 16-color graphics (VGA768.EXP).

Installing the Drivers

If you have not already installed AutoCAD 386, follow the instructions in your AutoCAD documentation to install it. Then follow these steps to install the drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the AutoCAD 386 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your AutoCAD 386 program files.

2. Log onto the AutoCAD directory on your hard disk.
3. Check to see if a file called ADIDISP.EXP already exists in the AutoCAD directory. If it exists, delete the file.
4. Identify the name of the driver file for the resolution you want to use from the list at the beginning of this section. Rename that driver file to the name ADIDISP.EXP. For example, if you want to use the 1024 x 768, 16-color graphics driver, type the following and press **Enter**:

```
REN VGA768.EXP ADIDISP.EXP
```

Configuring AutoCAD

The first time you use AutoCAD 386, you must configure it to use the new display driver. Follow these steps:

1. Start AutoCAD.
2. Press 5 and **Enter** to select the configuration option.
3. Press 3 and **Enter** to select the video display option.
4. Select ADI 386 display driver.
5. Save the new configuration and return to the main menu.

Autodesk AutoCAD, Version 10.0 (Fast Display List)

The AutoCAD drivers conform to the Autodesk Device Interface (ADI) for rendering and display drivers. The fast display drivers accelerate redraw, pan, and zoom functions and are available in the following resolutions:

- ❑ 640 x 480, 16color graphics
- ❑ 800 x 600, 16-color graphics
- ❑ 1024 x 768, 16-color graphics.

Installing the Drivers

If you have not already installed AutoCAD 10.0 on your computer, follow the instructions in your AutoCAD documentation to install it. Follow these steps to install the fast display drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the AutoCAD 10.0 (Fast Display List) drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions. When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your AutoCAD 10.0 program files.
2. Log onto the AutoCAD directory on your hard disk.
3. Type the following and press **Enter** to run the driver installation program you copied to your hard disk:

INSTVGA

4. Follow the instructions on the screen to reconfigure the drivers and create a batch file called FASTACAD.BAT.

Running AutoCAD

Prior to starting an AutoCAD or AutoShade session, you must load the display driver into the computer's memory. Follow these steps:

1. If necessary, log onto your AutoCAD directory.
2. Type the following and press **Enter**:

```
FASTACAD
```

This command runs the FASTACAD.BAT batch file, which loads the display driver into your computer's memory.

3. Then start AutoCAD or AutoShade. (The first time you use AutoCAD or AutoShade with the new driver, follow the instructions in the sections below to configure the programs for an ADI display.)
4. When you are finished using the programs, type the following and press **Enter** to remove the display driver from memory:

```
DLDVGA -U
```

Configuring AutoCAD

The first time you use AutoCAD with the driver, you need to configure it for an ADI display.

1. Select **Configure AutoCAD** from the AutoCAD main menu.
2. After you see the current configuration (if any), select **Configure video display**.

3. Select AD1 display v4.0 as your new driver. (The menu indicates that this is installed at interrupt 7A hex.)
4. Save the new configuration and return to the main menu.

Configuring AutoShade

If you have AutoShade, the first time you use it with the driver, you need to configure it for an ADI display. Follow these steps:

1. Delete the file SHADE.CFG from the AutoCAD directory on your hard disk.
2. Start AutoShade.
3. The program asks for a display and rendering driver. Select ADI for both drivers and indicate that you have a dual display system.
4. When you exit from the AutoShade program, it creates a new SHADE.CFG file.

Digital Research GEM, Version 2.2

Epson provides GEM 2.2 drivers for the following resolutions:

- 640 x 480, 16-color graphics (SDV1480.SYS)
- 800 x 600, 16-color graphics (SDV1600.SYS)
- 1024 x 768, 16-color graphics (SDV1768.SYS)
- 640 x 400, 256-color graphics (SDV2400.SYS)
- 640 x 480, 256-color graphics (SDV2480.SYS).

Installing the Drivers

Follow the steps below to install the display drivers. If you have already installed GEM 2.2, go to step 2 to install the GEM driver. If you have not yet installed GEM 2.2, begin with step 1.

1. Use the instructions in your GEM documentation to install GEM, version 2.2, with the standard VGA screen driver.

Insert the GEM 2.2 System Master Disk in drive A and log onto drive A. Type the following and press **Enter**:

```
GEMPREP
```

Follow the instructions displayed on the screen to complete the GEM installation. Remove the Master disk from drive A.

2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the GEM 2.2 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, you can accept the default pathname or enter a different one.

3. Remove the Utility diskette from drive A and insert a blank diskette.
4. Format the diskette using the MS-DOS `FORMAT` command. (See your MS-DOS Reference Manual for instructions.) When `FORMAT` prompts you for a volume label, type the following in uppercase letters and press **Enter**:

```
GEM_DRIVRPK
```

When you see the MS-DOS prompt, remove the formatted diskette.

5. Copy to the GEM_DRIVRPK diskette all of the display driver files that you copied to your hard disk in step 2. The filenames of the display drivers are listed at the beginning of this section. Use the MS-DOS COPY command to copy the files.
6. Remove the GEM_DRIVRPK diskette and insert the GEM 2.2 System Master Disk in drive A.
7. Log onto drive A, type the following, and press **Enter**:

SCRNSTAL C:
8. Follow the instructions in your GEM documentation and on the screen to finish the installation. You'll choose the appropriate driver from one of the GEM menus. You may need to insert the original GEM device driver disk as well as the GEM_DRIVRPK diskette you created.

Note

If you have installed GEM 2.2 and you want to change to another display driver, have the GEM_DRIVRPK diskette ready, and then start from Step 6 to change the driver.

Digital Research GEM, Version 3.0

Epson provides GEM 3.0 drivers for the following resolutions:

- ❑ 640 x 480, 16-color graphics (SDV1480.VGA)
- ❑ 800 x 600, 16-color graphics (SDV1600.VGA)
- ❑ 1024 x 768, 16-color graphics (SDV1768.VGA)
- ❑ 640 x 400, 256-color graphics (SDV2400.VGA)
- ❑ 640 x 480, 256-color graphics (SDV2480.VGA).

Installing the Drivers

If you have already installed GEM 3.0 on your computer, go to step 2 to install the GEM drivers. If you have not yet installed GEM 3.0, begin with step 1.

1. Use the instructions in the GEM documentation to install GEM 3.0 and select `IBM 16-color VGA (640x480)` or `Compatible` as your monitor. Insert the GEM 3.0 System Master Disk in drive A and log onto drive A. Then type the following and press **Enter**:

```
GEMSETUP
```

Follow the instructions displayed on the screen to complete the GEM installation.

2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the GEM 3.0 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, you can accept the default pathname or enter a different one.

3. Remove the Utility diskette from drive A and insert a blank diskette.
4. Format the diskette using the `MS-DOS FORMAT` command. (See your `MS-DOS Reference Manual` for instructions.) When `FORMAT` prompts you for a volume label, type the following in uppercase letters and press **Enter**:

```
GEM_ DRIVRPK
```

When you see the `MS-DOS` prompt, remove the formatted diskette.

5. Copy to the GEM_DRIVRPK diskette all the driver files that you copied to your hard disk in step 2. The filenames of the drivers are listed at the beginning of this section. Use the MS-DOS COPY command to copy the files.
6. Remove the GEM_DRIVRPK diskette and insert the GEM 3.0 System Master Disk in drive A.
7. Log onto drive A, type the following, and press **Enter**:

GEMSETUP
8. Follow the installation instructions in your GEM documentation to change the existing configuration. When you see Choose item to change, select Other (Driver Pak).
9. The program prompts you to insert the driver pack disk in drive A. Remove the System Master Disk, insert the GEM_DRIVRPK diskette and complete the installation.

Ventura Publisher, Versions 1.0 and 1.1

Epson provides drivers for Ventura Publisher, versions 1.0 and 1.1, in the following resolutions:

Version 1.0:

- 640 x 480, 2-color graphics (SDV480SYS)
- 800 x 600, 2-color graphics (SDV600.SYS)
- 1024 x 768, 2-color graphics (SDV768.SYS)

Version 1.1:

- 640 x 480, 2-color graphics (SDV480.EGA)
- 800 x 600, 2-color graphics (SDV600.EGA)
- 1024 x 768, 2-color graphics (SDV768.EGA).

Installing the Drivers

If you have not yet installed Ventura Publisher, begin with step 1. If you have already installed it, begin with step 2.

1. Install Ventura Publisher following the instructions in your Ventura documentation. Specify a Hercules driver as the temporary display driver.
2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Ventura Publisher 1.0 or 1.1 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, you can accept the default pathname or enter a different one.

3. Use the MS-DOS FORMAT command to format a blank diskette. (See your MS-DOS Reference Manual for instructions.)
4. Use the MS-DOS COPY command to copy all of the new driver files from your hard disk to the root directory of the newly formatted diskette in drive A. The filenames of the display drivers are listed at the beginning of this section.
5. Log onto drive A.

6. If you are using Ventura Publisher, version 1.0, type the following, and press **Enter**:

```
VPDRIVER
```

If you are using Ventura Publisher, version 1.1, type the following, and press **Enter**:

```
VPDRV1 _1
```

7. Follow the instructions on the screen to select an appropriate screen driver and complete the installation.
8. Remove the diskette from drive A.

Ventura Publisher, Version 2.0

Epson includes drivers for Ventura Publisher 2.0 in the following resolutions:

- 640 x 480, 2-color graphics (SDV1480.VGA)
- 800 x 600, 2-color graphics (SDV1600.VGA)
- 1024 x 768, 2-color graphics (SDV1768.VGA).

Installing the Drivers

If you have not yet installed Ventura Publisher, begin with step 1. If you have not already installed it, begin with step 2.

1. Install Ventura Publisher 2.0 following the instructions in your Ventura documentation.

2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Ventura Publisher 2.0 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, you can accept the default pathname or enter a different one.

3. Use the `FORMAT` command to format a blank diskette. (See your MS-DOS Reference Manual for instructions.)
4. Use the MS-DOS `COPY` command to copy all of the new driver files from your hard disk to the root directory of the newly formatted diskette in drive A. The filenames of the display drivers are listed at the beginning of this section.
5. Log onto drive A, type the following, and press **Enter**:

```
VPDRV2_0
```

6. Follow the instructions on the screen to select an appropriate screen driver and complete the installation.
7. Remove the diskette from drive A.

Lotus 1-2-3, Release 2.0 and Lotus Symphony, Releases 1.0, 1.1, and 2.0

The Lotus drivers work with releases 2.0 and 2.01 of Lotus 1-2-3, as well as releases 1.0, 1.1, and 2.0 of Lotus Symphony. Epson’s drivers support the following resolutions:

- 80 x 50, 16-color text
- 132 x 25, 16-color text
- 132 x 50, 16-color text.

Installing the Drivers

Follow the steps below to install the Epson drivers:

1. If necessary, install Lotus 1-2-3 or Symphony on your hard disk using the instructions in the program manual.
2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Lotus 1-2-3 and Symphony drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your 1-2-3 or Symphony program files.

3. Type `C :` and press **Enter** to log onto your hard disk.
4. Log onto the directory containing your Lotus program. (For 1-2-3, type `CD \ 123` and press **Enter**.)
5. To start the installation program, type the following and press **Enter**:

```
INSTALL
```

6. You see the Installation menu. Select `Advanced options`.
7. Then select `Add new drivers to library`.
8. Next choose `Modify current driver set`.
9. Select `Text display`.

10. Choose one of the following drivers from the Text Display menu:
 - VGA 82C452 (80 x 50)
 - VGA 82C452 (132 x 25)
 - VGA 82C452 (132 x 50).
11. After selecting the appropriate driver, select `Return to menu`.
12. At the Installation menu, select `Save changes`.
13. The menu prompts you for the name of your new Lotus configuration file. Lotus uses a default name in the prompt, such as `123.SET` for Lotus 1-2-3. Change this name to a filename that indicates the resolution of the driver in the file.

For example, if you installed the 132 x 25 driver, you could name this file `132X25.SET`. Or, if you installed the 80 x 50 driver, you might name the file `80X50.SET`.
14. Exit the Lotus installation program by selecting `Exit` from the main installation menu.

Running Lotus 1-2-3

You must include the filename of the new configuration file on the Lotus 1-2-3 command line. For example, if you named your file `132X25.SET`, type the following command and press **Enter** to start Lotus 1-2-3:

```
123 132X25.SET
```

Ashton-Tate Framework II, Release 1.0

Epson provides Framework II drivers for the following resolutions:

640 x 480, 16-color graphics:

- 80 x 25, 16-color text (CT452000.SC)
- 80 x 50, 16-color text (CT452003SC)
- 132 x 25, 16-color text (CT452030.SC)
- 132 x 50, 16-color text (CT452033.X).

800 x 600, 16-color graphics:

- 80 x 25, 16-color text (CT452200.SC)
- 80 x 50, 16-color text (CT452203.X)
- 132 x 25, 16-color text (CT452230.SC)
- 132 x 50, 16-color text (CT452233.SC).

Installing the Drivers

You install the driver when you install Framework II. If you have already installed the program, you must reinstall it along with the driver. Follow these steps:

1. Use the instructions in the Framework documentation to run the Framework Setup program and install the program. Choose option 1 for first time installation.
2. Exit Framework Setup.

3. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Framework II drivers to your hard disk. See "Using the VGA Driver Setup Program" on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your Framework II program files.

4. Use the MS-DOS FORMAT command to format a blank diskette. (See your MS-DOS Reference Manual for instructions.)
5. Copy to the newly formatted diskette all of the driver files in your Framework II directory. The filenames are listed next to the desired resolutions at the beginning of this section. Remove the diskette from drive A.
6. Run the Framework Setup program again.
7. Select the following:

All other uses of the setup program

8. On the next screen, select option 2. If this option does not correspond to your setup, follow the on-screen instructions to select a more appropriate option, or run Setup again.
9. When you see the main menu, select Configuration.
10. From the next menu, select Primary Hardware.
11. On the next display, select Screen Driver.
12. Then select the following:

I want to enter my own driver
filename

13. Type the filename of the driver you want to use and press **Enter**.
14. Press **M** to return to the main menu.
15. Select option 7 to save the new setup and exit from the program.

WordStar, Version 3.3

Your computer's built-in VGA adapter can run WordStar, version 3.3, in 132-column text mode without a special driver. However, you do need to install the VGAMODE utility program (described later in this appendix). Also, once you have installed WordStar on your hard disk, you need to install a patch (modification) to the WordStar program file, as described below.

Installing the Patch

To install the patch to the WordStar program, follow the steps below:

1. Log onto the WordStar directory on your hard disk.
2. Type the following and press **Enter** to make a backup copy of the original WordStar program file:

```
COPY WS.COM WSORIG.COM
```

3. Run the VGA Driver Setup program on your Utility 1 diskette to copy the WS33INST utility to your hard disk. From the Main Menu, select Utility programs. Then select WS33INST from the submenu. See "Using the VGA Driver Setup Program" on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your Wordstar 3.3 program files.

4. Now install the VGAMODE utility. See “VGAMODE Utility” on page A-57 for instructions.
5. Log onto the Wordstar 3.3 directory on your hard disk.
6. Type the following and press **Enter** to run WS33INST:

```
WS33INST
```

This utility makes the necessary patch to the WS.COM program file.

7. To rename the WS.COM file to WS132.COM, type the following and press **Enter**:

```
REN WS.COM WS132.COM
```

8. To rename the WSORIG.COM file to WS.COM, type the following and press **Enter**:

```
REN WSORIG.COM WS.COM
```

Running WordStar 3.3

To run WordStar 3.3 with 132 columns, you must specify 132-column text mode prior to starting WordStar by running the VGAMODE program. Follow these steps:

1. Type the following and press **Enter** to specify 132-column text mode:

```
VGAMODE 132, 25
```

2. Type the following and press **Enter** to start WordStar:

WS132

After you exit WordStar, if you want to return to 80-column mode, type the following and press **Enter**:

VGAMODE 80, 25

WordStar, Versions 4.0 and 5.0

Your VGA adapter can run WordStar, versions 4.0 and 5.0, in 132-column text mode without a special driver. However, you do need to install the VGAMODE utility (described later in this appendix). You also need to reconfigure WordStar to run with 132 columns:

After you install WordStar on your hard disk, follow these steps :

1. Log onto the WordStar directory on your hard disk.
2. Type the following and press **Enter** to start WordStar's installation program:

WSCHANGE

3. The program asks for the name of your WordStar program file. If you installed WordStar without changing the program filename, this file is named WS.EXE. Type the filename and press **Enter**.
4. The program then asks for the name of a file where the changes for the new configuration are to be saved. Type the following and press **Enter**:

WS132.EXE

5. At the Main Installation Menu, select `C o n s o l e .`
6. From the console menu, select `M o n i t o r .`
7. Then choose `S c r e e n S i z i n g .`
8. At the Screen Sizing menu, select `B` (for width), type `132`, and press **Enter**. Press `X` at each menu to exit from the installation program.
9. When the installation program asks if you want to save the new configuration, press `Y`. The program saves the new configuration in the `WS132.EXE` file and the computer displays the MS-DOS command prompt.

Running WordStar 4.0 and 5.0

To run WordStar 4.0 or 5.0 with 132 columns, you need to specify 132-column text mode *prior* to starting WordStar by running the `VGAMODE` program. Follow these steps:

1. Install the `VGAMODE` utility. See “`VGAMODE` Utility” on page A-57 for instructions.
2. Log onto your hard disk.
3. Type the command below and press **Enter** to specify 132-column text mode:

```
VGAMODE 132, 25
```

4. Type the following and press **Enter** to start WordStar.

```
WS132
```

After you exit WordStar, if you want to return to 80-column mode, type the following and press **Enter**:

```
VGAMODE 80, 25
```

WordPerfect, Versions 4.0 and 4.1

Your VGA adapter can run versions 4.0 and 4.1 of WordPerfect in 132-column text mode without a special driver. However, you do need to install the VGAMODE utility (described later in this appendix) and reconfigure WordPerfect.

After you have installed WordPerfect on your hard disk, follow these steps:

1. Install the VGAMODE utility, if you have not already done so. See “VGAMODE Utility” on page A-57 for instructions.
2. Log onto the WordPerfect directory on your hard disk.
3. Type the following and press **Enter** to start VGAMODE and initialize 132-column text mode:

```
VGAMODE 132, 25
```

4. Type the following and press **Enter** to run WordPerfect’s Setup program:

```
WP /S
```

5. At the Setup Menu, select Specify Screen Size.
6. Type 132 to edit the number of columns field.
7. Exit the Setup Menu. Your computer now displays WordPerfect in 132-column text mode.
8. To use the full width of the screen, you must change the margins. (See the WordPerfect documentation for instructions.)

Running WordPerfect 4.0 and 4.1

Whenever you run WordPerfect 4.0 or 4.1 with 132 columns, you need to specify 132-column text mode prior to starting the program. Follow these steps:

1. Type the following and press **Enter** to specify 132-column text mode:

```
VGAMODE 132, 25
```

2. Type the following and press **Enter** to start WordPerfect:

```
WP
```

After you exit WordPerfect, if you want to return to 80-column mode, type the following and press **Enter**:

```
VGAMODE 80, 25
```

WordPerfect, Version 5.0

Your VGA adapter can run WordPerfect 5.0 in 132-column text mode and in the following resolutions:

- 800 x 600, 16-color graphics
- 1024 x 768, 16-color graphics.

Installing the Drivers

Follow these steps to install the WordPerfect 5.0 drivers:

1. If necessary, install WordPerfect 5.0 on your hard disk.

2. Run the VGA Driver Setup program on your Utility 1 diskette to copy the WordPerfect 5.0 driver files to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your WordPerfect 5.0 program files.

3. If you have not already installed the VGAMODE utility, install it now. See page A-57 for instructions.
4. Log onto the WordPerfect directory on your hard disk.
5. Type `WP` and press **Enter** to start WordPerfect.
6. Hold down the **Shift** key and press **F1** to display the Setup menu.
7. At this menu, select 3 for display.
8. At the Display menu, select 5 for screen type.
9. Then choose the monitor type and resolution you want to use from the Graphics Screen Type menu.
10. Exit WordPerfect.

Configuring for 132 Columns

Follow these steps to run WordPerfect in 132-column text mode:

1. Type the following and press **Enter**:

```
VGAMODE 132, 25
```

2. Start WordPerfect. The program detects the rows and columns automatically.

Note

If **WordPerfect does not display** 132 columns and 25 rows on the screen, type the following **and press Enter** to start the program:

WP /SS=25,132

VersaCAD Design, Version 5.4

Epson provides VersaCAD 5.4 drivers for the following resolutions:

- 800 x 600, 16color graphics (EGA600.EXE)
- 1024 x 768, 16-color graphics (EGA768.EXE).

Installing the Drivers

If you have not already installed VersaCAD 5.4, follow the instructions in your VersaCAD documentation to install it. Follow these steps to install the drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the VersaCAD 5.4 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your VersaCAD 5.4 program files.

2. Start VersaCAD.
3. Press E to select the Environment option.
4. To select the Screen option, press S.

5. Press the space bar until you see one of the following options:

CHIPS 1024x768

CHIPS 800x600

6. Select the driver you want to use.
7. Exit VersaCAD.

Modifying the VersaCAD Batch File

Before you use VersaCAD with the new display driver, you need to modify the VersaCAD batch file. Follow these steps:

1. If necessary, log onto the root directory of your hard disk.
2. Use the EDLIN utility to edit the file VCAD54.BAT, as described in the following steps. (See your MS-DOS Reference Manual for instructions on using EDLIN.)
3. The second line of the VCAD54.BAT file contains the command to load the display driver. Change the name of the current driver file to the name of the new driver file for the resolution you chose. (The new driver filenames are listed at the beginning of this section.)

For example, if you want to use the 1024 x 768, 16-color graphics driver, change the filename to the following:

EGA768.EXE

4. Save the new batch file as you exit the EDLIN utility.
5. Hold down Ctrl and Alt and press Del to reset the computer.

VersaCAD 386, Version 5.4

Epson provides VersaCAD 386 drivers for these resolutions:

- 800 x 600, 16-color graphics (EGAP600.EXE)
- 1024 x 768, 16-color graphics (EGA768P.EXE).

Installing the Drivers

If you have not already installed VersaCAD 386, follow the instructions in your VersaCAD documentation to install it. Follow these steps to install the drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the VersaCAD 386 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your VersaCAD 386 program files.

2. Start VersaCAD.
3. Press E to select the Environment option.
4. To select the Screen option, press S.
5. Press the space bar until you see one of these options:

CHIPS 1024x768

CHIPS 800x600

6. Select the driver you want to use.
7. Exit VersaCAD.

Modifying the VersaCAD 386 Batch File

Before you use VersaCAD 386 with the new display driver, you need to modify the VersaCAD 386 batch file in the root directory. Follow these steps:

1. If necessary, log onto the root directory of your hard disk.
2. Use the EDLIN utility to edit the file VCAD386.BAT. as described in the following steps. (See your MS-DOS Reference Manual for instructions on using EDLIN.)
3. The fourth line of the VCAD386.BAT file contains the command to load the display driver. Change the name of the current driver file (probably EGAP) to the name of the new driver file for the resolution you chose. (The new driver filenames are listed at the beginning of this section.)

For example, if you want to use the 1024 x 768, 16-color graphics driver, change the filename to the following:

EGAP768 . EXE

4. Save the new batch file as you exit the EDLIN utility.
5. Hold down **Ctrl** and **Alt** and press **Del** to reset the computer.

CADVANCE, Version 3.50

Epson provides CADVANCE 3.50 drivers in the following resolutions :

- 800 x 600, 16-color graphics (GS600.DRV)
- 1024 x 768, 16-color graphics (GS768.DRV).

Installing the Drivers

If you have not already installed CADVANCE 3.50 on your computer, follow the instructions in your CADVANCE documentation to install it.

Follow these steps to install the drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the CADVANCE 3.50 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the directory containing your CADVANCE 3.50 program files.

2. Log onto the CADVANCE directory on your hard disk.
3. Type the following and press **Enter** to delete the old display driver file:

```
DEL GS.DRV
```

4. Identify the name of the driver file for the resolution you want to use from the list at the beginning of this section. Rename that driver file to the name GS.DRV. For example, if you want to use the 1024 x 768, 16-color graphics driver, type the following and press **Enter**:

```
REN GS768.DRV GS.DRV
```

OrCAD, Version 3.22

The following resolutions are available for OrCAD 3.22:

- ❑ 800 x 600, 16-color graphics (CHIPS600.DRV)
- ❑ 1024 x 768, 16-color graphics (CHIPS768.DRV).

Installing the Drivers

If you have not already installed OrCAD 3.22 on your computer, follow the instructions in your OrCAD documentation to install it.

Then run the VGA Driver Setup program on your Utility 1 diskette to copy the OrCAD 3.22 drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the name of your OrCAD driver directory. (That directory is probably called C:\ORCAD\DRIVERS.)

Configuring OrCAD

1. Log onto the OrCAD root directory on your hard disk. (The default OrCAD root directory is C: \ORCAD.)
2. Type the following and press **Enter** to run OrCAD in configuration mode:

DRAFT /C

3. Type DP to enter the driver pathname.

4. Then enter the name of the directory containing the new display driver files. For example, type the following and press **Enter**:

```
C:\ORCAD\DRIVERS
```

5. Type **DD** to set the driver filename.
6. Press **S** to choose a special driver.
7. Then enter the name of the driver file for the resolution you want to use. (The driver filenames are listed at the beginning of this section.) For example, to use the 1024 x 768, 16-color graphics driver, type the following and press **Enter**:

```
CHIPS768.DRV
```

8. Press **U** to save the new configuration.
9. To exit OrCAD, press **Q**.

Generic CADD, Version 1.1, Level 3

The following resolutions are available for Generic CADD, version 1.1, level 3:

- 800 x 600, 16-color graphics (CHIPS600.VGD)
- 1024 x 768, 16-color graphics (CHIPS768.VGD).

Installing the Drivers

If you have not already installed Generic CADD, version 1.1, level 3, on your computer, follow the instructions in your Generic CADD documentation to install it.

Follow these steps to install the drivers:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the Generic CADD drivers to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the driver files, erase the default name and enter the name of the directory containing your Generic CADD program files.

2. Log onto your Generic CADD directory.
3. Identify the name of the driver file for the resolution you want to use in the list at the beginning of this section. Rename that driver file to the name VGA.VGD. For example, if you want to use the 1024 x 768, 16-color graphics driver, type the following and press **Enter**:

```
REN CHIPS768.VID VGA.VGD
```

Configuring Generic CADD

1. Type the following and press **Enter** to run the Generic CADD configuration program:

```
CONFIG
```

2. Select option 1, Select a Video Graphic Display.
3. Enter the appropriate number for the display driver you want to use.
4. Press **ESC** and then **Y** to exit the Generic CADD configuration program.

VESA Driver, Version 1.0

The VESA driver conforms to the VESA Super VGA Standard #VS891001 and supports the following resolutions:

- 800 x 600, 16-color graphics
- 1024 x 768, 16-color graphics
- 640 x 400, 256-color graphics
- 640 x 480, 256-color graphics.

If an application program offers a VESA standard option to provide Super VGA resolutions, you must install this VESA driver in order to use the option. You can select any of the resolutions listed above from your application program options, as long as your monitor is capable of displaying them.

When you install the VESA driver, you automatically install the SETVESA and VTEST utilities. SETVESA sets the page size and the number of pages for the VESA Super VGA modes. VTEST runs a diagnostic test on the VESA drivers to make sure they are operating properly. Follow the steps in the next section to install the VESA driver and its utilities. Then see “Using SETVESA” and “Using VTEST,” below, for instructions on using the VESA utilities.

Installing the Driver

Follow these steps to install the VESA driver and the SETVESA and VTEST utilities:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the VESA driver and utility files to your hard disk. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the directory to contain the driver and utility files, erase the default name. Then enter the name of your utility directory, if you have one.

2. If you have not done so already, add the pathname of the VESA utility files to your AUTOEXEC.BAT file. (See your MS-DOS Reference Manual for instructions.)
3. To place the VESA driver in your computer's memory and enable the driver, type the following and press **Enter**:

```
VESA452
```

If you want to enable all of the available resolutions, type the following and press **Enter**:

```
VESA452 +
```

Do not use the + parameter unless your monitor is capable of displaying all of the available resolutions. If you use the + parameter and then have problems with the application program that uses the VESA standard, delete the VESA driver and utility files. Then reinstall the driver and utilities, and enable VESA without using the + parameter.

Using SETVESA

The SETVESA utility allows you to set the page size and number of pages for the VESA Super VGA modes. The format for the command is:

```
SETVESA [page size] [number of pages]
```

Valid values for page size are 32, 64, or 128. The number of pages can be either 1 or 2. The default values set by the VESA driver are 64 (for page size) and 1 (for number of pages). Enter the SETVESA command with new values if you want to change the default settings.

You cannot enter the following settings:

```
SETVESA 32 1
SETVESA 128 2
```

If you enter the command without any parameters, SETVESA displays the current settings on the screen.

Follow these steps to use the SETVESA utility:

1. If necessary, log onto the directory containing the SETVESA.EXE utility file.
2. Type the SETVESA command followed by the parameters you want to use and press **Enter**, as in the following example:

```
SETVESA 64 2
```

Using VTEST

The VTEST utility tests the VESA driver and displays the results of the test on your monitor screen. Follow these steps:

1. If necessary, log onto the directory containing the VTEST.EXE utility file.
2. Type the following and press **Enter**:

```
VTEST
```

3. VTEST displays information about the first mode it will test. Press any key to begin testing.
4. VTEST tests various aspects of each mode and displays the results on the screen. At the end of the test, you see the MS-DOS prompt.

Utility Programs

Your Utility diskettes contain the following VGA utility programs:

- VGAMODE
- SETVGA
- MODETEST
- WS33INST
- SNOOZE.

These utilities are described in the sections below.

VGAMODE Utility

VGAMODE provides 132-column text in popular text-based applications, such as WordStar and WordPerfect. The VGAMODE utility allows you to specify the number of rows (lines) and columns you want displayed on the screen.

Installing the utility

Follow these steps to install VGAMODE:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the VGAMODE utility to your hard disk. From the Main Menu, select **Utility programs**. Then select **VGAMODE** from the submenu. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the utility file, you can either press **Enter** to use the default directory or change the pathname to your utility directory, if you already have one.

2. After you have copied the VGAMODE utility to your hard disk, it is best to include the pathname for VGAMODE and other utilities in an AUTOEXEC.BAT file. See the next section for instructions.

Adding VGAMODE to the AUTOEXEC.BAT file

For convenience in accessing VGAMODE, you can include a pathname in your AUTOEXEC.BAT file. Follow these steps:

1. At the MS-DOS command prompt in the root directory, type the following and press **Enter**:

```
COPY AUTOEXEC.BAT+CON AUTOEXEC.BAT
```

2. To set the path for the VGAMODE utility, type the following and press **Enter**:

```
PATH C:\pathname\
```

For instance, if you were using the default directory offered by the VGA Driver Setup program, you would type:

```
PATH C:\UTIL\
```

3. Press F6 and then **Enter**.

(See your MS-DOS Reference Manual for more information about pathnames.)

Using the utility

You specify values for the desired number of rows and columns by typing them on the VGAMODE command line. The command format is:

```
VGAMODE [columns], [rows]
```


Valid values for columns are 80 and 132; for *rows*, use 25 or 50. (Do not include the brackets.)

For example, if you want your screen to display 132 columns and 25 rows, type the following and press **Enter**:

```
VGAMODE 132, 25
```

To use VGAMODE, you must configure the application program that uses VGAMODE for the same screen size. See the appropriate section in this appendix for your application program(s).

Note

Certain monitors cannot display 132 columns or 50 rows on the screen. The following table specifies the number of rows that can be displayed on common monitors:

Monitor	Columns	Rows
IBM VGA display (analog)	80	25 or 50
Multi-frequency display	80 or 132	25 or 50

SETVGA Utility

SETVGA lets you operate your built-in VGA adapter in a specific emulation mode. This allows you to use programs that were written especially for one of the following adapters when you cannot run these programs in regular VGA mode:

- IBM monochrome adapter
- IBM color graphics adapter
- IBM enhanced graphics adapter
- Hercules monochrome graphics adapter.

Note

Only a few, old software packages require you to use the SETVGA program.

Installing the utility

Follow these steps to install SETVGA:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the SETVGA utility to your hard disk. From the Main Menu, select `Utility programs`. Then select SETVGA from the submenu. See "Using the VGA Driver Setup Program" on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the utility file, you can either press **Enter** to use the default directory or change the pathname to your utility directory, if you already have one.

2. After you have copied the SETVGA utility to your hard disk, it is best to include the pathname for SETVGA and other utilities in your AUTOEXEC.BAT file. See the next section for instructions.

Adding SETVGA to the AUTOEXEC.BAT file

For convenience in accessing SETVGA, you can include a pathname in your AUTOEXEC.BAT file. Follow these steps:

1. At the MS-DOS command prompt in the root directory, type the following and press **Enter**:

```
COPY AUTOEXEC.BAT+CON AUTOEXEC.BAT
```

2. To set the path for the SETVGA utility, type the following and press **Enter**:

```
PATH C:\pathname\
```

For instance, if you were using the default directory offered by the VGA Driver Setup program (described above), you would enter this command:

```
PATH C:\UTIL\
```

3. Press F6 and then **Enter**.

(See your MS-DOS Reference Manual for more information about pathnames.)

Using the utility

To lock your VGA interface into an emulation mode, you include the name of the mode on the SETVGA command line. The command format is:

```
SETVGA [emulation]
```

(Do not include the brackets.)

Use one of the following values for *emulation*:

Emulation	Description
MDA	Enables and locks MDA emulation
CGA	Enables and locks CGA emulation
EGAC	Enables and locks EGA color emulation
EGAM	Enables and locks EGA monochrome emulation
HERC	Enables and locks Hercules emulation
VGA	Disables emulation and returns to VGA operation

For example, to emulate an EGA color adapter, type the following and press **Enter**:

```
SETVGA EGAC
```

MODETEST Utility

The MODETEST utility tests all of the video modes available to your monitor and displays the following information:

- Mode number
- Resolution
- Number of available colors
- Vertical and horizontal scanning frequency
- Dot clock (pixel) frequency.

MODETEST also displays the available colors in a set of color bars and in a changing border around the screen.

Installing and using the utility

Follow these steps to install and use MODETEST:

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the MODETEST utility to your hard disk. From the Main Menu, select `Utility programs`. Then select `MODETEST`. See “Using the VGA Driver Setup Program” on page A-4 for instructions. When Setup asks for the name of the drive and directory to contain the utility file, you can either press **Enter** to use the default directory or change the pathname to another one.
2. Log onto the directory containing `MODETEST`.
3. Type the following and press **Enter**:

MODETEST
4. The screen displays information about the first video mode. Press any key to test the next mode or press **ESC** to exit `MODETEST`.

5. Continue pressing any key to test all the available video modes. After the last test, you see a table of the results.
6. Press ESC to exit MODETEST.

WS33INST Utility

The WS33INST utility provides 132-column text mode for WordStar, version 3.3 by patching (modifying) the WordStar program file. See “WordStar, Version 3.3,” earlier in this appendix, for instructions on installing and using the utility.

SNOOZE Utility

The SNOOZE utility causes your monitor screen to go blank after a specified period of time if your system has been inactive. This preserves the quality of your screen display by preventing any single image from being “burned into” the monitor. The screen remains blank until you press any key; then it resumes display of the current activities.

Installing the utility

1. Run the VGA Driver Setup program on your Utility 1 diskette to copy the SNOOZE utility to your hard disk. From the Main Menu, select *Utility programs*. Then select SNOOZE. See “Using the VGA Driver Setup Program” on page A-4 for instructions.

When Setup asks for the name of the drive and directory to contain the utility file, you can either press **Enter** to use the default directory or change the pathname to your utility directory, if you already have one.

2. After you have copied the SNOOZE utility to your hard disk, it is best to include the pathname for SNOOZE and other utilities in your AUTOEXEC.BAT file. See the next section for instructions.

Adding SNOOZE to the AUTOEXEC.BAT file

For convenience in accessing SNOOZE, you can include a pathname in your AUTOEXEC.BAT file. Follow these steps:

1. At the MS-DOS command prompt in the root directory, type the following and press **Enter**:

```
COPY AUTOEXEC.BAT+CON AUTOEXEC.BAT
```

To set the path for the SNOOZE utility, type the following and press **Enter**:

```
PATH C:\pathname\
```

For instance, if you were using the default directory offered by the VGA Driver Setup program (described above), you would type:

```
PATH C:\UTIL\
```

3. Press **F6** and then **Enter**.

Using the utility

To activate the utility, type **SNOOZE** and press **Enter**. You see information about the **SNOOZE** command syntax and a message that the **SNOOZE** delay is set to 5 minutes.

The default period of inactivity before the screen goes blank is 5 minutes. You can specify your own time period by entering a number from 1 to 60 (minutes) on the **SNOOZE** command line. For example, to set a **SNOOZE** delay of 15 minutes, type the following and press **Enter**:

```
SNOOZE 15
```

To disable **SNOOZE**, type **SNOOZE 0** and press **Enter**.

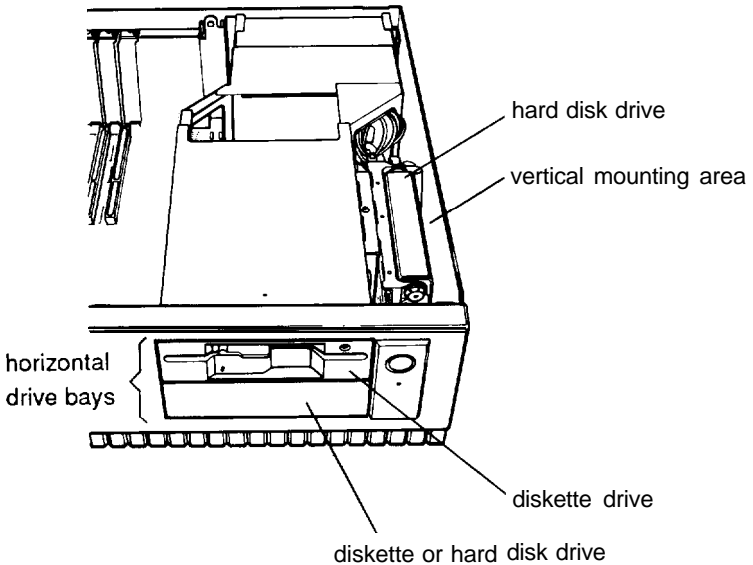
Appendix B

Installing and Removing Disk Drives

This appendix describes how to do the following

- ❑ Install a hard disk or diskette drive
- ❑ Remove a hard disk or diskette drive
- ❑ Change the hard disk drive jumper settings.

Your system can include up to three drives: either two diskette drives and one hard disk drive or one diskette drive and two hard disk drives. Your computer has two horizontal drive bays and one vertical mounting position to hold the drives, as shown below.



How to Use This Appendix

The instructions in this appendix describe how to install and remove optional Epson diskette and hard disk drives. All drives sold by Epson for the Equity 386/25 PLUS are qualified and recommended for use in this system. Your drive may look a bit different from the one illustrated in this appendix, but you install it the same way.

If you are installing or removing a non-Epson drive, some of the steps in this appendix may not apply to your drive; see the documentation that came with it for more information.

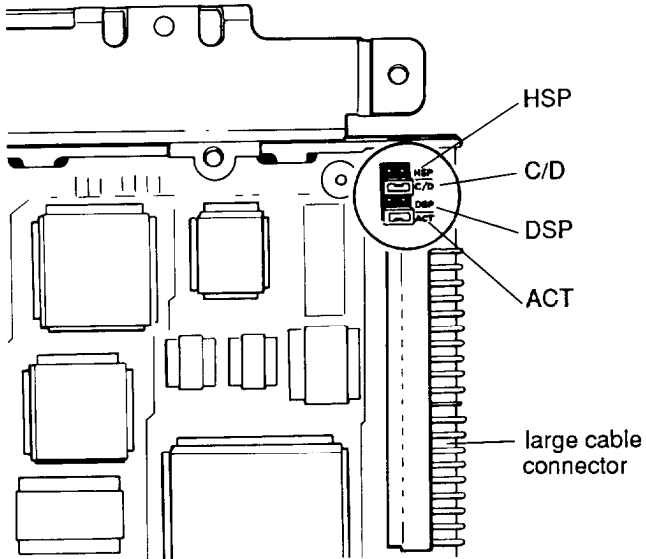
Each section describes a part of the process you may need to perform. Here are the guidelines:

- ❑ Before you perform any of the procedures described in this appendix, follow the steps in Chapter 5 to remove the computer's cover.
- ❑ If you are removing your only hard disk drive, see "Removing a Hard Disk from the Vertical Position" on page B-24.
- ❑ If you are installing a hard disk drive or removing one and leaving another in the computer, follow the steps under "Setting the Hard Disk Drive Jumpers" on page B-4 first.
- ❑ If you are installing or removing a diskette drive and you currently have a hard disk drive installed in the vertical mounting position, see "Removing a Hard Disk from the Vertical Position" on page B-24.
- ❑ If you are installing or removing a diskette drive and you do not have a hard disk drive installed in the vertical mounting position, see "Installing or Removing a Disk Drive in the Horizontal Position" on page B-27.

Additional instructions in each section tell you which steps to perform next.

Changing the Jumper Settings

The hard disk drive jumpers are located on the drive's circuit board, near the large cable connector.



The jumpers on your drive may be in a slightly different location, but you set them the same way.

There are four positions for the jumpers on each hard disk drive. Jumpers are installed in only two of the positions and the other two positions are left open.

If you are installing both of your hard disk drives at one time, you should install the drive in the horizontal drive bay first. See “Installing or Removing a Disk Drive in the Horizontal Position” on page B-27 for instructions.

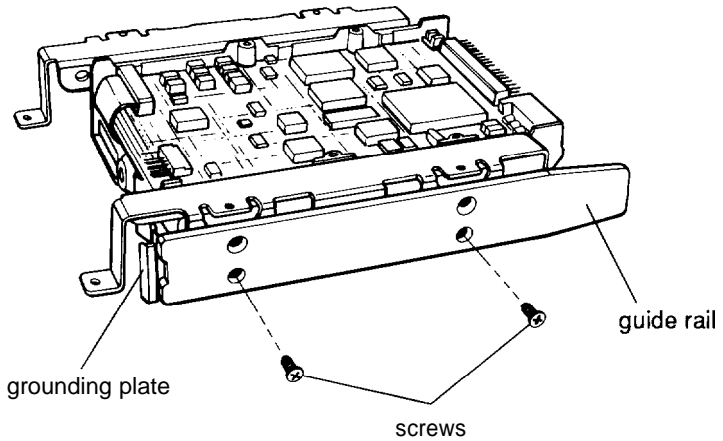
If one of your hard disk drives is already installed in the computer, follow the steps under “Removing a Hard Disk From the Vertical Position” on page B-24 to remove it. Then set the jumpers on both drives while they are out of the computer. The steps in that section tell you which instructions to follow next.

Note

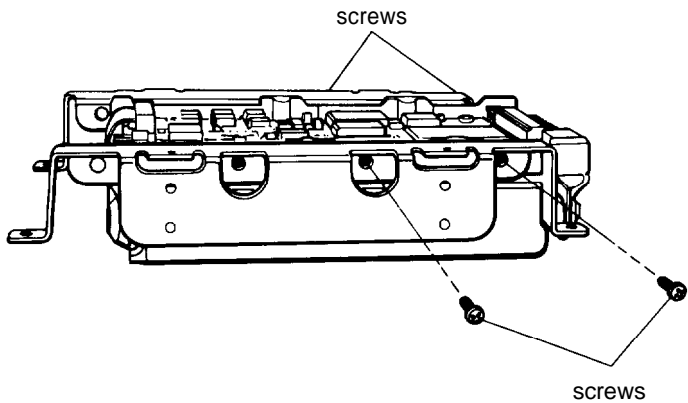
If you are removing one hard disk drive and leaving one in your computer, be sure to set the jumpers on the remaining drive to indicate that you have only one hard disk drive. See the table above for the jumper settings. Then follow the instructions under “Removing a Hard Disk From the Vertical Position” on page B-24 so you can access the jumpers on the drive.

On one side, there may also be a plastic guide rail. Follow these steps to remove the mounting frames (and guide rail) from the drive:

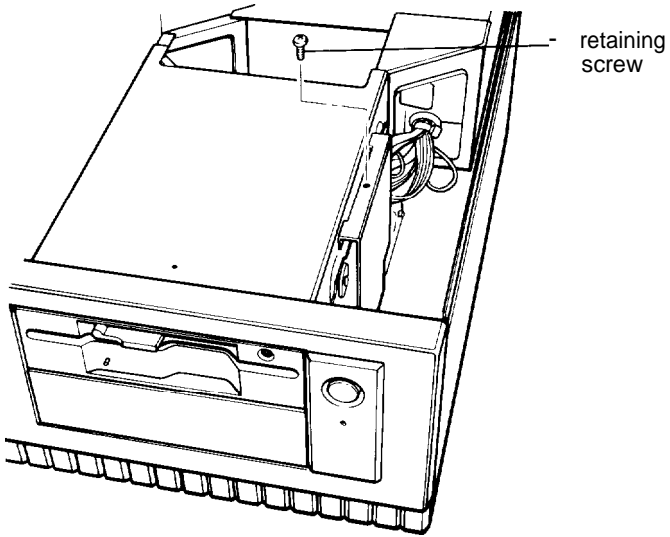
1. If necessary, remove the screws securing the plastic guide rail and the metal grounding plate to one of the mounting frames, as shown below.



2. Remove the four screws securing the mounting frames to the hard disk drive. There are two screws securing each frame, as shown below.



2. Using a screwdriver, remove the screw securing the mounting plate to the computer and set it aside. Then lift up the mounting plate to remove it.



Installing the Drive

Follow these steps to install the hard disk drive in the vertical mounting position:

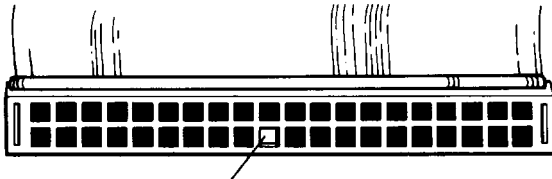
1. Locate the hard disk drive ribbon cable that came in the box with your computer. It is a flat cable with three connectors on it (one on each end and one in the middle).



Use the connector in the middle of the cable. As shown below, there are two rows of holes in the end of the connector. One of the holes is blocked with a plug.

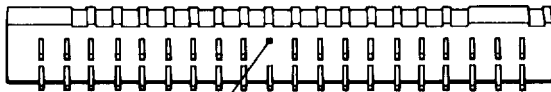
The ribbon cable socket on the back of the drive has two rows of pins. In one of the rows, a pin is missing.

ribbon cable connector



blocked hole

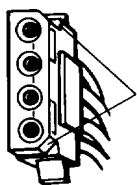
ribbon cable socket



missing pin

3. Locate one of the power supply cables that lead from the power supply in the computer (behind the horizontal drive bays). The cables are labelled P1, P2, or P3 and have a clear plastic connector on one end. You can use any of the three cables. As shown below, the end of the connector has two notched corners. As shown below, the end of the connector has two notched corners.

power supply cable

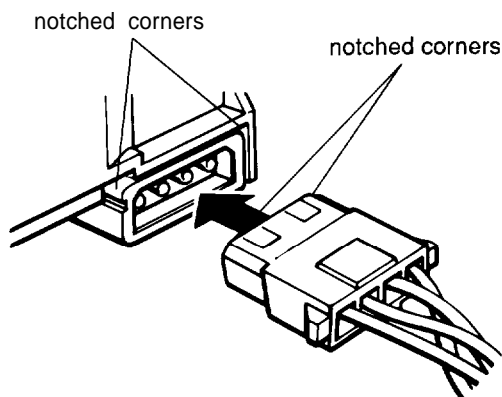


power supply socket

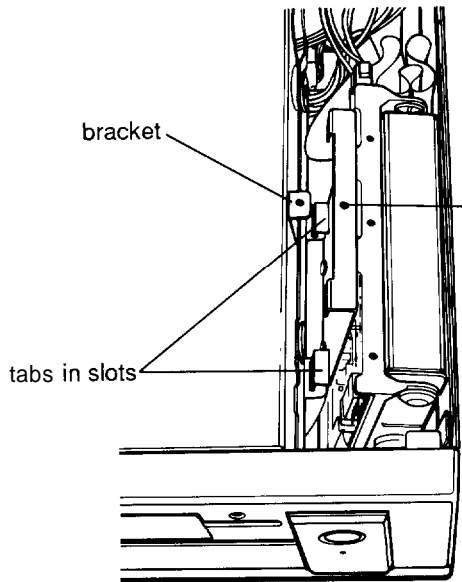


The power supply socket is on the back of the hard disk drive, next to the cable you just connected. The socket also has two notched corners, as shown above.

Align the connector with the socket so that the notched corners on the connector line up with the notched corners of the socket.



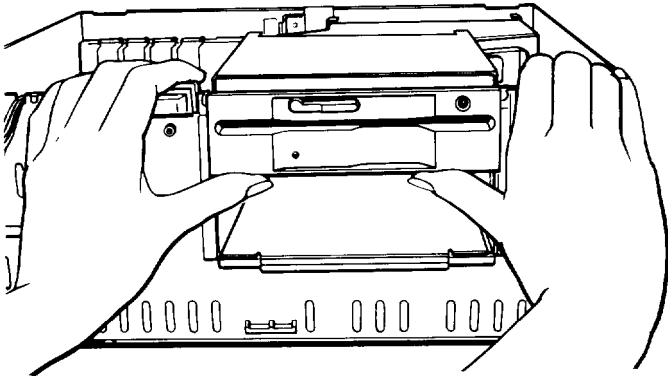
5. As you lower the drive into the vertical mounting area, guide the long end of the cable underneath the drive and curl up the short end behind the drive.



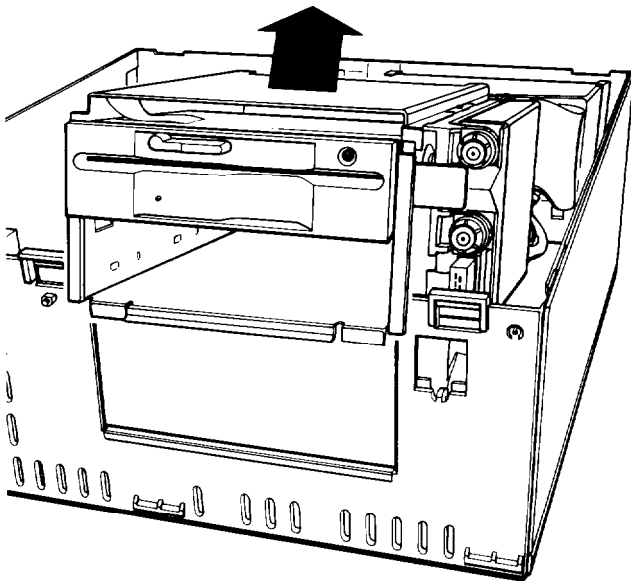
As shown above, fit the tabs on the mounting plate into the slots on the side of the subassembly. Then tilt the drive toward the subassembly and align the retaining screw hole on the mounting plate with the hole in the bracket.

6. Secure the drive to the bracket with the retaining screw.

If you used the instructions above to install your drive while the subassembly is out of the computer, see “Replacing the Subassembly” on page B-47. Do not follow the steps in the next section.



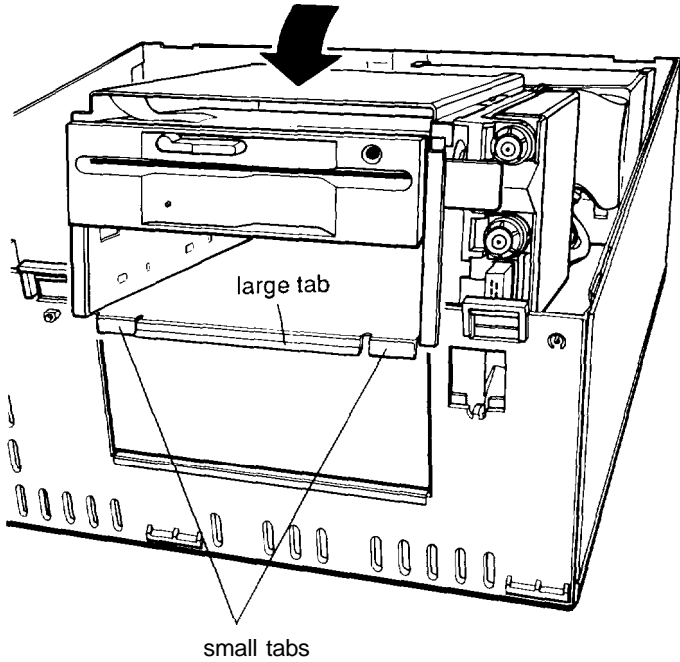
3. Raise the front of the subassembly to a slight angle, as shown below.



Caution

If you do not correctly align the holes with the pins, you could severely damage your computer when you push in the connector.

6. Carefully lower the front of the subassembly onto the computer, as shown below.

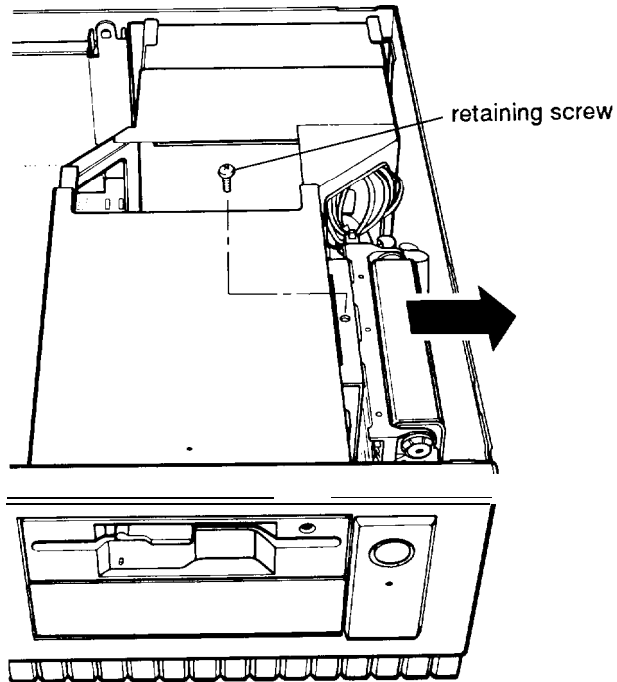


8. Tilt up the front panel until the clips on the top touch the computer. Then push on the top of the panel until it clicks into place. Your diskette drive(s) should be flush with the front of the panel.
9. Follow the steps on page 5-30 to replace the computer's cover. Then see "Post-installation Setup" later in Chapter 5 for instructions on configuring your computer for use with your new hard disk drive.

Note

After you change your computer's drive configuration, the computer may take up to five minutes to complete power-on diagnostics the next time you turn it on.

2. Remove the retaining screw securing the hard disk drive mounting plate to the computer and set it aside.



3. Tilt the hard disk drive slightly to the right, away from the subassembly, and lift it out of the vertical mounting area. Turn it over and set it on top of the subassembly with the gray mounting plate facing up. Since the drive is attached to its cables, make sure you do not try to move it too far away from the subassembly as you turn it.

6. Remove the four screws securing the hard disk drive mounting plate to the hard disk drive. Then remove and store the mounting plate along with the screws.
7. Wrap the hard disk drive in its original packing materials and set it aside. Then carefully arrange the power supply cable so that it fits down into the vertical mounting area. Make sure that the cable does not interfere with any other cables or mechanisms.
8. Follow the steps on page 5-30 to replace the computer's cover. Then see "Post-installation Setup" later in Chapter 5 for instructions on configuring your computer for use without a hard disk drive.

Note

After you change your computer's drive configuration, your computer may take up to five minutes to complete power-on diagnostics the next time you turn it on.

Installing or Removing a Disk Drive in the Horizontal Position

This section describes how to install or remove a hard disk drive or a diskette drive in the lower horizontal drive bay. You can use these same instructions if you need to install a different diskette drive in the upper drive bay; however, the illustrations show the lower bay.

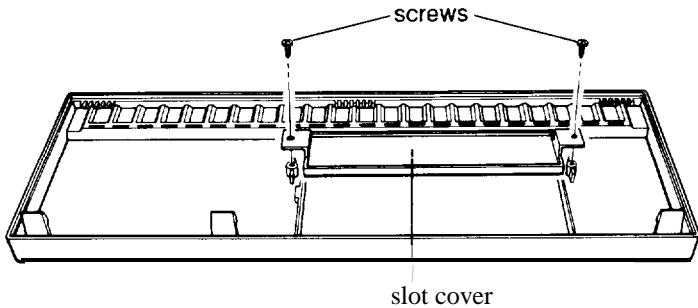
If you are installing a second hard disk or diskette drive, you must install it in the lower horizontal drive bay. Your first diskette drive is in the upper bay and your first hard disk is in the vertical mounting position beside the drive bays.

Pull the panel away from the front of the computer.

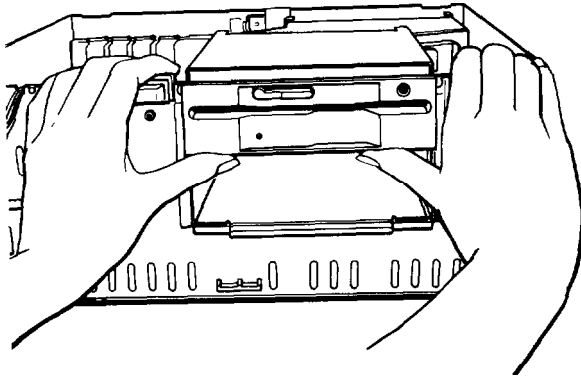
If you are going to install a hard disk drive in the lower horizontal position, set the front panel aside and go to step 4.

If you are installing a diskette drive, remove the slot cover from the front panel, as described in step 3.

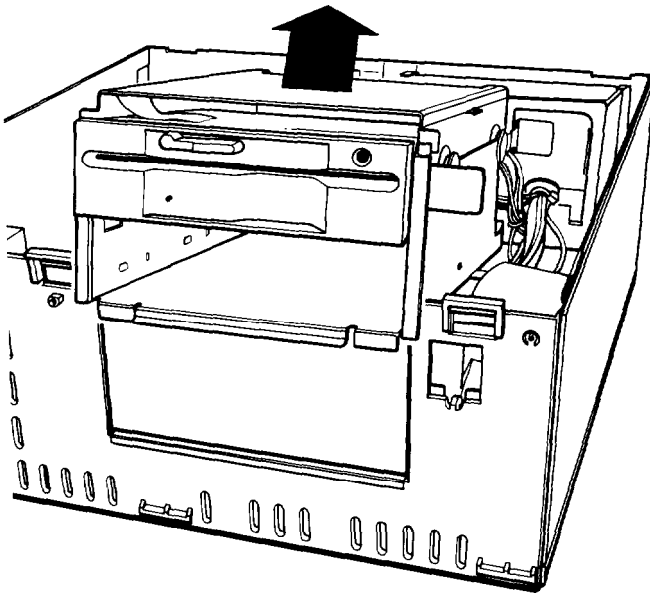
3. Place the front panel face down and use a screwdriver to remove the screws securing the slot cover to the panel. Lift out the slot cover, as shown below.



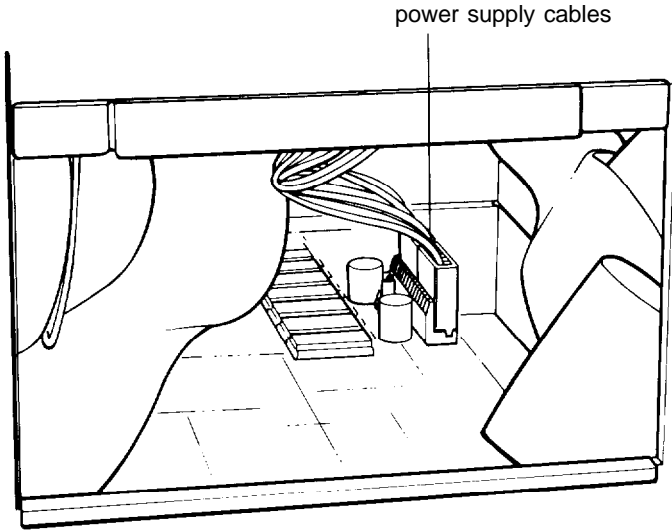
Set the front panel, slot cover, and screws aside.



5. Lift up the front of the subassembly with your thumbs. Raise it to a slight angle, as shown below.



8. Still holding up the subassembly, reach further back underneath it and disconnect the two power supply cables connected to the back right side of the main system board, as shown below. Pull each of the connectors straight up. Do not pull only on the cables.

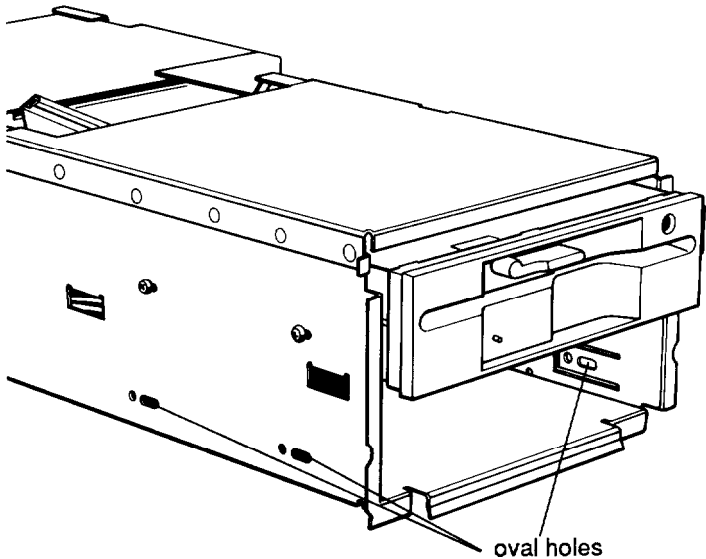


9. Lift the entire subassembly out of the computer and carefully place it on your work surface.

If you are installing a drive, follow the instructions under “Installing a Disk Drive in the Horizontal Position” on the next page.

If you are removing a drive, see “Removing a Disk Drive From the Horizontal Position” on page B-44.

2. There are two or three holes on each side of the disk drive. When you insert the drive, align the appropriate round holes in the drive with the two oval holes on each side of the drive bay, as shown below.

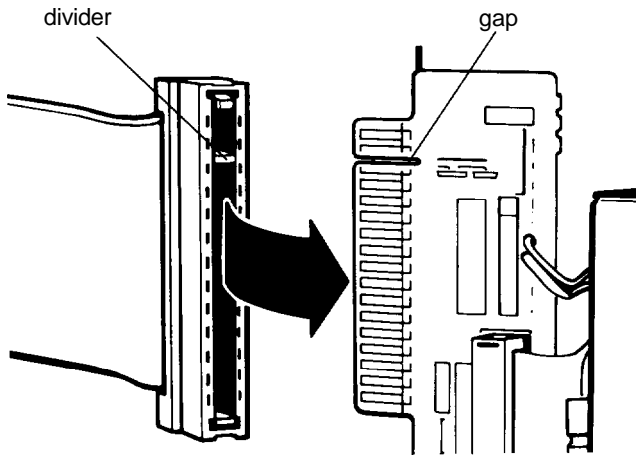


3. Insert the drive into the lower drive bay and slide it toward the back of the subassembly. Watch the oval holes on the side of the drive bay so you can see when the holes on the drive are positioned in the middle of them.

If you are installing a diskette drive, adjust its position so that the front of the drive lines up with the drive in the upper bay. (A hard disk drive fits all the way into the bay.)

The interface that protrudes from the back of the drive has gold contacts on both sides. Near one end of the interface, there is a gap to accommodate the plastic divider on the connector.

Align the connector with the interface so that the plastic divider on the connector lines up with the gap in the interface, as shown below.



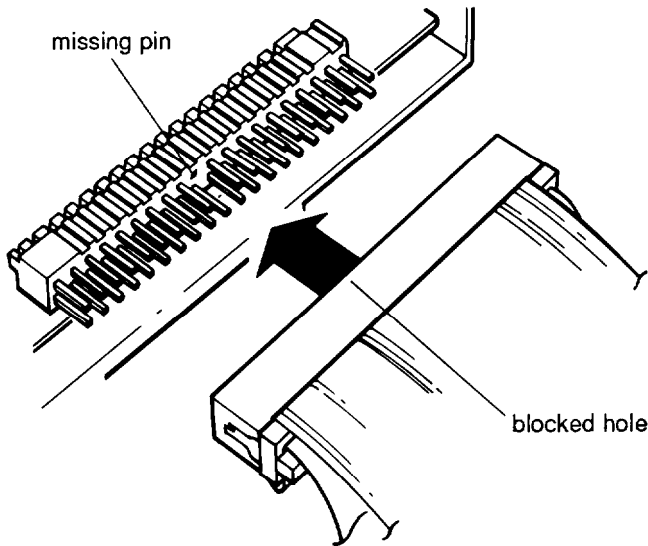
Make sure the cable connector fits properly onto the drive interface and then push it onto the interface.

Caution

If you do not correctly align the connector, you could severely damage your diskette drive when you push it in.

If you removed a hard disk drive from the vertical mounting position, go to step 6. If you did not, go to step 8 for instructions on connecting the power cable.

Align the connector with the socket so that the row in the connector with the blocked hole lines up with the row in the socket with the missing pin, as shown below.



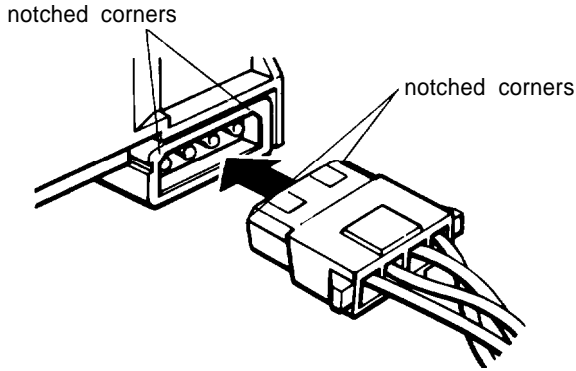
Make sure the holes fit over all the pins and then push the connector onto the pins.

Caution

If you do not correctly align the holes with the pins, you could severely damage your hard disk drive when you push in the connector.

If you will have two hard disk drives in your system, perform the procedures in steps 6 and 7 again. This time, however, attach the connector at the end of the ribbon cable to the horizontally mounted hard disk drive you just installed. (If necessary, turn the subassembly upside down to make it easier to connect the cable.)

Position the power supply cable connector so that the notched corners on the connector line up with the notched corners of the power supply socket on your drive.



Make sure the holes fit over all the pins and then push the connector onto the pins.

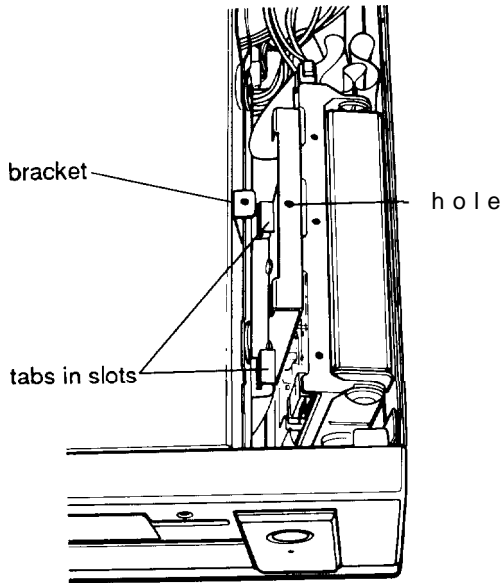
Caution

If you do not correctly align the holes with the pins, you could severely damage your drive when you push in the connector.

If you do not need to reinstall a vertically mounted hard disk drive, see “Replacing the Subassembly” on page B-47.

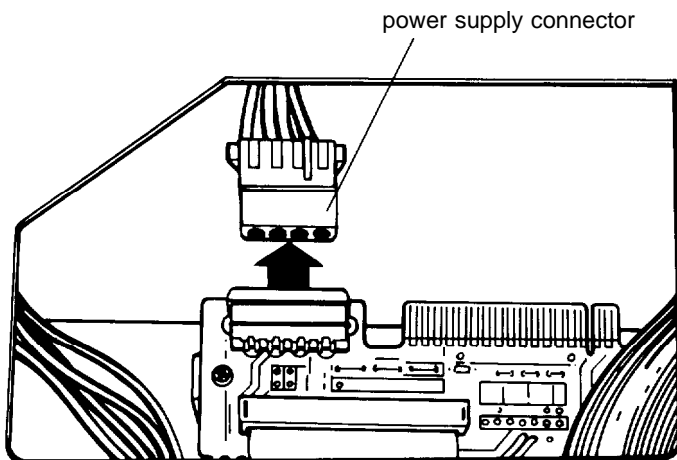
If you just connected the power supply cable to your vertically mounted hard disk drive, perform step 8 again to connect the power supply cable to the drive you just installed in the horizontal drive bay. Then see “Replacing the Drive on the Subassembly” on the next page for instructions on reinstalling the vertically mounted hard disk drive.

2. As you lower the drive onto the subassembly, guide the long end of the cable underneath the drive and curl up the short end behind it. (If you just installed a hard disk drive in the lower horizontal drive bay, the short end of the cable leads to that drive.)

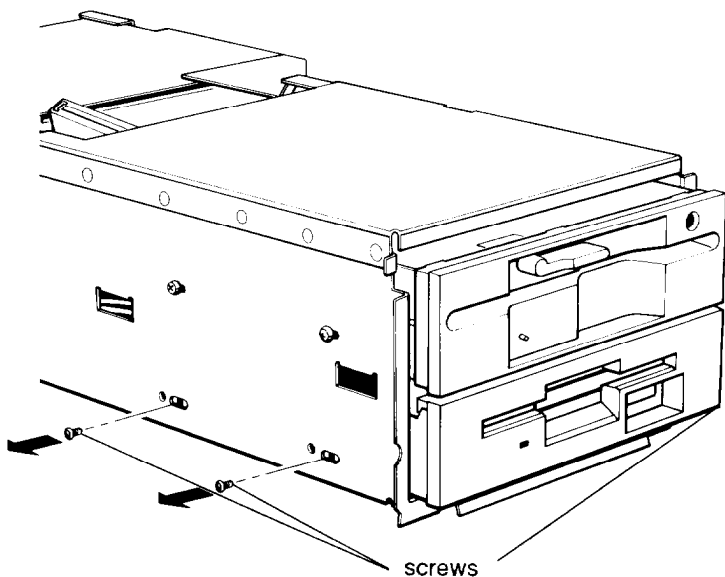


As shown above, fit the tabs on the mounting plate into the slots on the side of the subassembly. Then tilt the drive toward the subassembly and align the retaining screw hole on the mounting plate with the hole in the bracket.

3. Secure the drive to the bracket with the retaining screw.
4. To replace the subassembly, see the instructions on page B-47.



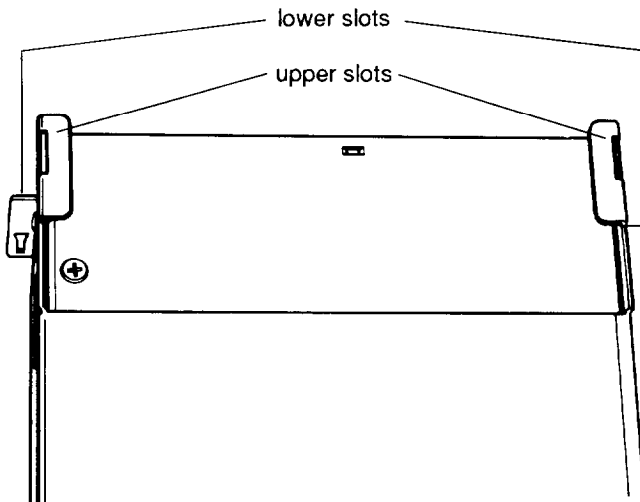
3. Using a screwdriver, remove the screws securing the drive to the drive bay. There are two screws on each side, as shown below.

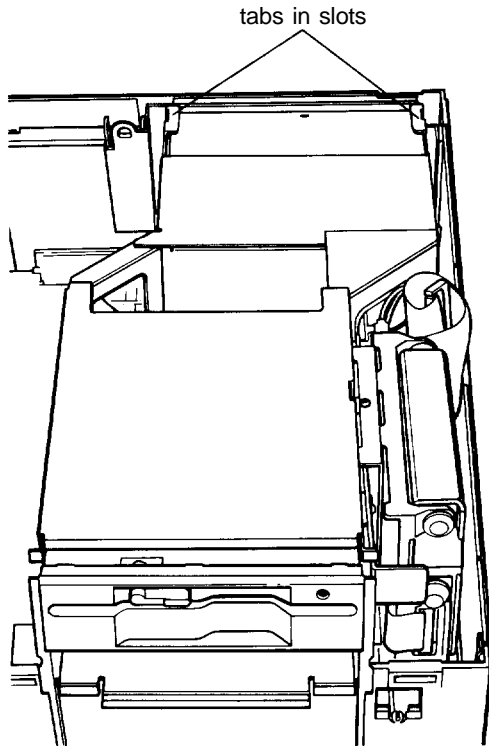


Replacing the Subassembly

Follow the steps below to replace the subassembly inside your computer:

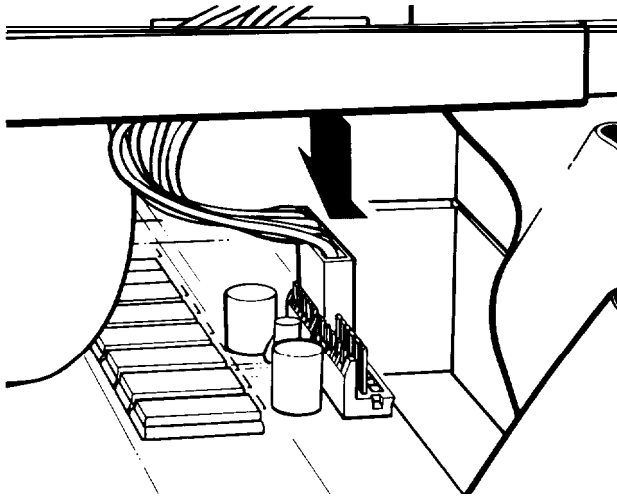
1. Notice that there are four mounting slots on the back of the subassembly: two in the upper corners and two in the lower corners.





2. Hold up the front of the subassembly at a slight angle and arrange the ribbon cables leading from the back of the drives so they curve underneath the subassembly and toward the front.

4. Position power supply connector P4 so the large tab on the connector faces the right side of the computer. Beginning with the six pins toward the back of the computer, carefully line up the holes in the connector with the pins in the socket. Make sure the holes fit over all six pins and then push the connector onto the pins.



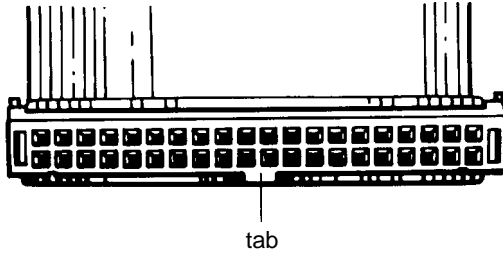
Caution

If you do not correctly align the holes with the pins in the socket, you could severely damage your computer when you push in the connector.

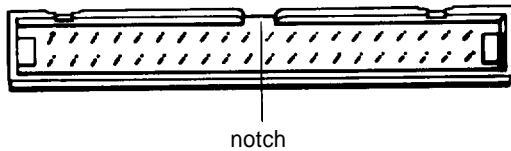
5. Connect power supply connector P5 to the remaining six pins in the socket using the same procedure.
6. Still holding up the subassembly, locate the hard disk drive and diskette drive ribbon cables. (The hard disk drive cable is slightly longer than the diskette drive cable.) Look at the back of each drive to make sure you know which cable is which.

7. Now connect the hard disk drive cable. As shown below, there is a tab on one side of the connector, just like the diskette drive connector. The hard disk drive socket at the front of the main system board also has a notch on one side.

hard disk drive connector



hard disk drive socket

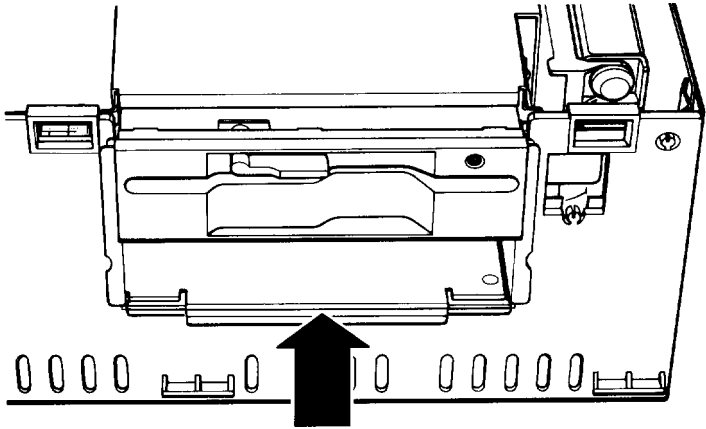


Align the connector with the socket so the tab on the connector lines up with the notch in the socket. Make sure the holes in the connector fit over all of the pins in the socket and then push in the connector.

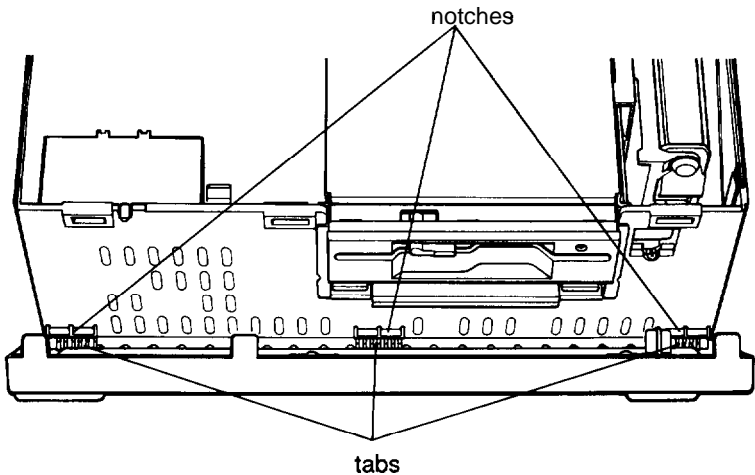
Caution

If you do not correctly align the holes with the pins, you could severely damage your computer when you push in the connector.

Guide the tabs on the front of the subassembly over the opening in the front of the computer so the two small tabs sit behind the opening and the large tab with the curved lip sits over the front of the opening. If necessary, press on the large tab until the subassembly snaps into place.



9. To replace the front panel, fit the three ridged tabs on its bottom edge into the three notches on the lower edge of the computer, as shown below.



Physically Formatting a Hard Disk

This appendix describes how to physically format a hard disk. Sometimes called a low-level format, this procedure should not be confused with the logical format performed by the MS-DOS `FORMAT` command. The physical formatting of a hard disk is a separate step that is usually done at the factory by the disk manufacturer.

If your computer came with a factory-installed hard disk, or if you have installed an optional Epson hard disk, it has already been physically formatted. You need only follow the instructions in the MS-DOS Installation Guide to prepare your hard disk for use.

If you have installed a hard disk that came with its own format utility, use that program to physically format the disk.

You may need to use the procedure in this chapter to physically format a hard disk if either of the following is true:

- Your hard disk is producing numerous read/write errors or you are having other serious problems with it. Sometimes, after a hard disk has been used for a long time, its data becomes fragmented, causing the disk to perform less efficiently or produce errors. You may want to reformat the disk in this case.
- You have installed a non-Epson hard disk in your computer that has never received the low-level format and did not come with its own format utility.

Physically formatting a hard disk erases any data it contains. Be sure to back up all the data on your hard disk to diskettes before you format it. See your MS-DOS Reference Manual for instructions on backing up data.

Caution

If you are unsure if formatting is necessary, contact your Epson dealer for assistance.

In addition to destroying all the data on the hard disk, formatting removes any partitions and logical formatting defined on the disk by FDISK, SELECT, or FORMAT. After you physically format a new or used hard disk (using option 1 or 2 of the Hard Disk Format Menu), you need to install MS-DOS. Follow the instructions in your MS-DOS Installation Guide. The installation process automatically partitions and formats the hard disk to prepare it for use. (If you are installing another operating system, follow the instructions in the documentation that came with it.)

Choosing the Type of Format

Follow these steps to display the formatting options:

1. Insert the Reference diskette in drive A.
2. Turn on or reset the computer. The computer automatically loads MS-DOS and displays the Operation Menu.
3. Press 2 to highlight Format hard disk and press **Enter**. The Hard Disk Format Menu appears on the screen:

HARD DISK FORMAT MENU	
1	- Format
2	- Destructive surface analysis
3	- Non-destructive surface analysis
0	- Exit

The formatting options work as follows:

- ❑ Format first scans the disk (if it has no defective track table) for defective (bad) tracks and lets you decide which tracks to mark as bad. Then the program formats the disk and marks the bad tracks so they are never used to store data.
- ❑ Destructive surface analysis tests the entire disk for read/write errors or unflagged bad tracks and updates the defective track table. Because this option writes and reads data on the disk, it destroys all data on any track that produces an error. You cannot run the Destructive surface analysis on a disk that has never been formatted.
- ❑ Non-destructive surface analysis checks the disk for unflagged bad tracks without destroying data. You cannot run the Non-destructive surface analysis on a disk that has never been formatted.

The type of format you choose depends on whether you are reformatting a disk that has been used or formatting a new disk for the first time. See the recommendations below.

Reformatting a Used Disk

If you are reformatting a disk you have been using that appears to be damaged, follow these steps:

1. Use the Non-destructive surface analysis test to check for unflagged bad tracks.
2. If errors occur during the Non-destructive surface analysis, back up your hard disk to diskettes. (See your MS-DOS Reference Manual for instructions on backing up data.)
3. Run the Destructive surface analysis.

Formatting a New Disk

Many hard disk drives come with a printed list of bad tracks but the bad tracks are not flagged on the disk. You may need to modify the defective track table to add the bad tracks. Other hard disks (such as those supplied by Epson) come with the bad tracks already flagged. If you are formatting a new hard disk that has never been formatted, select the `l-Format` option to format the disk.

Selecting an Option

When using this program, you often need to select an option from a menu. There are two ways to do this:

- You can use the arrow keys (`↑ ↓ ← →`) to highlight the option and press `Enter`.
- You can type the number of the option and press `Enter`.

You can select almost any option that appears on the screen using either of these two methods.

Starting the Formatting Process

If you have more than one hard disk drive, you see this prompt:

```
Enter drive number ? (1/2)
```

Select 1 for the first hard disk or 2 for the second hard disk. Then see the instructions below for the Hard Disk Format Menu option you want to use.

Option 1, Format

If you select 1 -Format from the Hard Disk Format Menu, you see the following (for a disk that does not have a defective track table):

```
Format Hard Disk < Drive 1: >
```

```
Scan hard disk to get defective track  
information      ? (Y/N)
```

(If the disk already has a defective track table, you do not see the message because the disk does not need to be scanned for bad tracks.)

Select Y to scan the disk or N to skip the scanning process.

If you select Y, the program scans the disk and displays these messages during the process:

```
Scanning for flagged bad tracks...  
  
Head : nnn      Cylinder : nnnnn
```

You see the head and cylinder numbers decrease as the program progresses. After scanning the disk, the program displays the results, such as the following:

```
Scanning finished.  
  
Count of tracks flagged bad      =      1  
Count of tracks with other errors =      0  
Count of good tracks             =    4884
```

Next you see the following prompt:

```
Accept recommended skewed sectors in  
format      : 1 ? (Y/N)
```

For an Epson hard disk drive, it is best to accept the recommended skewed sector (also called the interleave factor) of 1. For other hard disk drives, you may need to change this value if the documentation that came with the disk recommends a different number.

To accept the default, select Y .

To enter a new value, select N . You see the following prompt:

```
Enter new skewed sectors in
format                      (1-16):
```

Enter a number from 1 through 16 which equals the maximum sector number for the drive minus 1. The maximum sector number varies, depending on the drive type. Then press **Enter**.

Next you see this prompt:

```
Accept recommended skewed sectors per
head in format : 0 ? (Y/N)
```

For an Epson hard disk drive, accept the recommended value of 0. For another type of drive, use the value recommended in the documentation for the drive.

To accept the default, select Y .

To enter a new value, select N . You see the following prompt:

```
Enter new skewed sectors per head
in format (0-16):
```

Enter a number from 0 through 16 which equals the maximum sector number for the drive minus 1. The maximum sector number varies, depending on the drive type. Then press **Enter**.

The program now allows you to edit the defective track table:

Cylinder	Head	Cylinder	Head	Cylinder	Head	Cylinder	Head	Cylinder	Head
nnn	nn								
Defective Track Table: Modify defective track table ? (Y/N)									

At the bottom of the table is this prompt:

```
Modify defective track table ? (Y/N)
```

Select N to leave the table as it is. Then skip the following section and go on to “Formatting the Disk” on page C-9.

To add bad tracks to the defective track table, see the section below.

Modifying the Defective Track Table

If you select Y to modify the table, you see the following options at the bottom of the table:

```
Defective Track Table : Move box cursor to desired track with cursor key  
A = Add track, C = Change track, D = Delete track, F = Finish editing  
Enter com-and :
```

To add a bad track, follow these steps:

1. Press A. You see this prompt:

```
Enter cylinder number (1 -nnnn):
```

2. Type the number of the cylinder containing the bad track and press **Enter**. You see this prompt:

```
Enter head number (0 -nn):
```

3. Type the head number for the bad track and press **Enter**.

To cancel the operation, press **Enter** without typing a value.

When you complete a valid entry, it appears in the table and you can add the next bad track, if necessary.

If you make a mistake, move the cursor block to the incorrect track and press **C** to alter the track data or press **D** to remove the track from the table. Change the track data just as you add a track.

The maximum valid cylinder number and head number (*nnnn* and *nn*) vary according to the capacity of the hard disk. If you enter an invalid cylinder or head number, a reminder of the range of values appears and the program asks you to enter the value again.

When you finish adding all the bad tracks, press **Enter** without typing a value. After you complete editing, check the entries in the defective track table. When you are sure the table is correct, press **F**. The program displays a warning about the consequences of proceeding with formatting.

Formatting the Disk

When you are ready to start formatting the disk, you see the following warning:

```
WARNING?  ALL DATA WILL BE DESTROYED IN
ALL PARTITIONS OF HARD DISK, NOT JUST IN
MS-DOS PARTITION!
Do you want to start formatting ? (Y/N)
```

If you are not sure you want to format the hard disk, select: N. If you are sure, select Y; the program gives you one more chance to cancel:

```
DOUBLE CHECK THAT YOU HAVE BACKUP
DISKETTE COPIES OF ALL YOUR FILES.
Do you want to exit and check your
file copies ? (Y/N)
```

Select Y to cancel formatting (and check your backups) or N to continue.

If you continue with formatting, you see:

```
Format started.
```

```
Head : nnn      Cylinder : nnnnn
```

You see the head and cylinder numbers decrease as the program progresses. When formatting is complete, the program flags any bad tracks and you see a series of messages like these:

```
Format finished.
```

```
Flagging bad tracks...
```

```
Cylinder is nnnn, head is nn
```

```
Format completed.
```

```
Press ENTER to return to the menu.
```

Press **Enter** to return to the Hard Disk Format Menu.

Option 2, Destructive Surface Analysis

You can perform a Destructive surface analysis of your hard disk to accurately locate any bad tracks, and flag any bad tracks that are not flagged.

Caution

If any errors occur during this check, all data on the track that produces the error is destroyed. For this reason, if you think that an unflagged bad track is causing trouble, first run option 3, Non-destructive surface analysis, to check the disk surface.

The Destructive surface analysis operates by a complex process of writing, reading, and verifying information on every track of the hard disk, except for tracks that are already flagged as bad tracks.

To start this test, select 2-Destructive surface analysis from the Hard Disk Format Menu. You see these messages:

```
Analyze Hard Disk <Drive 1:>
```

```
Read/Save/Write/Read/Restore/Read  
check for all tracks...
```

```
Current cylinder is nnnn
```

As the program checks each track, it counts the cylinder numbers (nnnn) down to zero. When the test is complete, the program displays a report on the status of the disk, including a table of unflagged tracks that produced write, read errors-such as the following:

```
Analysis finished.
```

```
Count of tracks flagged bad           =    n  
Count of tracks with write, read errors =    n  
Count of good tracks                   =  nnnn
```

```
No write, read error was detected.
```

```
No data was destroyed.
```

```
Press ENTER to return to the menu.
```

If the program finds one bad track that is not flagged, the summary would show one track with a write, read error. The report is followed by a table like this:

Write, Read Error Tracks							
Cylinder	Head	Cylinder	Head	Cylinder	Head	Cylinder	Head
237	2						
Confirm to register the tracks in the Write, Read Error Track Table as bad tracks.							
Do you want to register the error tracks as bad tracks? (Y/N)							

To flag the error tracks as bad, select Y. You see a list of the tracks as they are flagged and these messages:

```
Flagging bad tracks...
```

```
Cylinder is 237, head is 2
```

```
Press ENTER to return to the menu.
```

Press **Enter** to return to the Hard Disk Format Menu.

Option 3, Non-destructive Surface Analysis

The Non-destructive surface analysis does not destroy any data, and you can use it to safely check the condition of your hard disk drive. However, this test does not flag any bad tracks it detects.

To start the test, select 3-Non-destructive surface analysis from the Hard Disk Format Menu. You see these messages:

```
Analyze Hard Disk <Drive 1:>
```

```
Read/Verify check for all tracks...
```

```
Current cylinder is nnnn
```

As the program checks each track, it counts the cylinder numbers down to zero. When the test is complete, the program displays a report on the status of the disk, such as the following:

```
Analysis finished.
```

```
Count of tracks flagged bad           =      n
```

```
Count of tracks with read, verify errors =      n
```

```
Count of good tracks                   =   nnnn
```

```
No read, verify error was detected.
```

If the program finds errors, the screen displays a table of the tracks that gave errors, similar to the one the Destructive surface analysis displays.

After the status reports, you see this message:

```
Press ENTER to return to the menu.
```

Check the information displayed. Then press **Enter** to return to the Hard Disk Format Menu.

Exiting the Hard Disk Format Menu

To leave the Hard Disk Format Menu, select 0-Exit . The screen displays the Operation Menu.

If you formatted the hard disk with option 1 or 2, you must now install MS-DOS (or another operating system) on the hard disk to prepare it for use. Remove the Reference diskette from drive A and then follow the instructions in your MS-DOS Installation Guide. The installation process automatically partitions and formats the hard disk.

If you only ran the Non-destructive surface analysis, remove the Reference diskette from drive A and press the **RESET** button to load MS-DOS.

Appendix D

Troubleshooting

You should not encounter any difficulties as you set up and use your computer, but if anything out of the ordinary happens, refer to this appendix. You can correct most problems by adjusting a cable connection, repeating a software procedure, or resetting the computer.

Besides trying the suggestions in this chapter, you can run diagnostics checks on the various components of your computer system. See Appendix E for instructions.

If the suggestions here or in Appendix E do not solve the problem, contact your authorized Epson dealer. Your dealer may be able to solve the problem; if not, he or she can refer you to an Authorized Epson Customer Care Center for service. If necessary, call the Epson Customer Information Center at (213) 782-2600 for the location of your nearest Authorized Epson Customer Care Center.

Identifying Your System

When you contact your dealer or Customer Care Center, be ready to provide the serial number of your computer, its configuration (including the type of disk drives, monitor, and option cards), and the names and version numbers of any software programs you are using. You can find the serial number on the computer's back panel.

If you are able to use MS-DOS, follow the steps below to obtain your MS-DOS version number and the version number of your computer's ROM BIOS.

If you have a hard disk, follow these steps:

1. At the MS-DOS command prompt, type `ROMBIOS` and press **Enter**. (You may need to log onto the directory where `ROMBIOS.COM` is stored.) Write down the version number displayed on your screen.
2. At the MS-DOS command prompt, type `VER` and press **Enter**. The screen displays the MS-DOS version number. Write down the number so you can give it to your dealer.

If you do not have a hard disk, follow these steps:

1. Insert the Reference diskette in drive A and turn on or reset your computer.
2. At the Operation Menu, select `Exit to MS-DOS for more utilities` and press **Enter**.
3. At the `A>` prompt, type `ROMBIOS` and press **Enter**. Write down the version number displayed on your screen.
4. Remove the Reference diskette and insert your Startup diskette in drive A. Type `VER` and press **Enter**. The screen displays the MS-DOS version number. Write down the number so you can give it to your dealer.

Error Messages

Your computer's built-in memory (ROM) contains a series of diagnostics programs, called power-on diagnostics, which your computer runs automatically every time you turn it on. These programs check internal devices such as ROM, RAM, the timer, the keyboard controller, and the hard disk drive. The RAM test program displays the total amount of memory currently installed in your system. If the computer finds an error, it displays a specific error number and error message on the screen.

If the error is not serious, you see this prompt:

(Resume = "F1" key)

Write down the error message and code number, and then press F1 to continue. Give the error message and code number to your dealer when reporting a problem.

If the error is serious, the computer cancels further checking and halts system initialization. The error message remains on the screen and the computer locks up. If this happens, contact your dealer as soon as possible. Report this information and both the error message and code number to your dealer.

The following table lists all the error codes and messages that may appear during power-on diagnostics checks. If you receive an error message, look it up in the table below. It directs you to the proper troubleshooting section in this appendix. If you do not see an error message, read the section that covers your problem.

Power-cm diagnostics error codes and messages

Error code	Message	Action
System board		
101	System board error	Contact dealer
102	System board error	
103	System board error	
105	System board error	
106	System board error	
107	System board error	
108	System board error	
Real-time clock		
161	System options not set	Contact dealer
162	System options not set	Run Setup; see Chapter 2
163	Time and date not set	Run Setup; see Chapter 2
164	Memory size error	Run Setup; see Chapter 7

Power-on diagnostics error codes and messages (continued)

Error code	Message	Action
Memory		
171	Bios shadow RAM error	Contact dealer Run Setup; see Chapter 2
173	Cache options error	
201	Memory error	
202	Memory address error	
203	Memory address error	
Keyboard		
301	Keyboard error	See "Keyboard Problems"
303	Keyboard or system unit error	
304	Keyboard or system unit error	
Monitor		
401	CRT error	See "Monitor Problems"
501	CRT error	
Diskette drive(s) and controller		
601	Diskette error	See "Diskette Problems" or "Diskette Drive Problems"
Parallel port (printer interface)		
901	Parallel port error	See "Printer Problems"
Serial port (RS-232C port)		
1101	Serial port error	See "Printer Problems"
Hard disk drive(s) and controller		
1760	Disk 0 parameter failure	See "Hard Disk Drive Problems"
1761	Disk 1 parameter failure	
1770	Disk 0 parameter error	
1771	Disk 1 parameter error	
1780	Disk 0 failure	
1781	Disk 1 failure	
1782	Disk controller failure	
1790	Disk 0 error	
1791	Disk 1 error	

Power-on diagnostics error codes and messages (continued)

Error code	Message	Action
Auxiliary device(s)		
8601	Auxiliary device failure	See "Mouse Problems"
8602	Auxiliary device failure	
8603	Auxiliary device failure	

The Computer Won't Start

If your computer does not start when you turn on the power, check the following:

1. Is the power light on? If not, remove any diskettes and turn off the power. Check that the power cord is securely connected to both the AC inlet on the back panel and an electrical outlet. Replace the Startup or Reference diskette, if necessary, and turn on the computer again.

Caution

If you turn off the computer for any reason, always wait at least five seconds before turning it back on. You can damage the computer if you turn it off and on rapidly.

2. If the power light still does not come on, check the electrical outlet for power. Turn off your computer and unplug the power cord from the wall outlet. Plug a lamp into the outlet, and turn it on to see if the outlet supplies power.
3. If the electrical outlet is working and all the connections are secure but your computer still won't start, call your dealer.

Note

If the computer starts but you can't see anything on the screen, see "Monitor Problems," below.

The Computer Does Not Respond

If your computer locks up and does not respond when you type on the keyboard, follow these steps:

1. Some operations take longer than others to complete. For example, the computer takes longer to sort a database than to accept a single typed character. If your computer still does not respond after a reasonable length of time, proceed to the next step.
2. Your computer may take a long time to complete its power-on diagnostics if you have just made a change in your system's configuration. The first time you turn on your computer after making such a change, it can take up to five minutes to finish its self test, depending on what you changed. If the computer does not display the MS-DOS prompt after five minutes, press the **RESET** button and try again. If that doesn't work, insert the Reference diskette in drive A and press the **RESET** button. If the computer still does not boot, contact your Epson dealer.
3. Did you enter the correct password? See "Password Problems," below.
4. Could your software be causing the problem? If you are running an application program, see "Software Problems," later in this appendix.
5. The problem could be caused by your keyboard. See "Keyboard Problems," later in this appendix. If your keyboard is operating properly, proceed to the next step.
6. If you want to stop whatever the computer is doing and return to the MS-DOS command prompt, hold down the **Ctrl** key and press **Break** (or press C). See Chapter 3 for more information on stopping a command or program.

7. If your computer still does not respond, you can reset it using the **Ctrl Alt Del** command. If that command doesn't work, you can reset the computer with the **RESET** button. See "Resetting Your Computer" in Chapter 3 for more information.
8. If resetting the computer does not work, turn off the computer and wait at least five seconds. If you do not have a hard disk drive, insert the Startup diskette in drive A. Then turn on the computer. It should load MS-DOS.
9. If you installed an EGA or VGA display adapter card, or another type of card that you want to be the primary display adapter, you must set jumper JP14 to disable the built-in VGA adapter. Otherwise, you will not see any display on the screen. See "Changing the Jumper Settings" in Chapter 5 for instructions.

If you are using one or more display adapter cards, you may also need to change the setting of jumper JP12. This jumper tells the computer whether you are using a color or monochrome monitor. (JP12 is set for color at the factory.) If the jumper is set incorrectly, you see one of these messages:

- 401 CRT error
- 501 CRT error.

If you are using two different types of video cards, set jumper JP12 to the primary monitor type. You may also need to change the setting later if you change the type of monitor you are using. See "Changing the Jumper Settings" in Chapter 5 for instructions.

Password Problems

If you set a power-on password using the Setup program, you must enter this password before you can use the system. When you turn on the computer, the screen displays a key prompt (○_m) If you do not enter the correct password, you see an X on the screen. The computer gives you a second and third chance to enter it correctly. If after three tries you have not entered the correct password, the computer locks up and does not respond to your keyboard entries.

Note

If you enabled network server mode when you set a password, you do not see the key prompt. For more information, see “Using Your Computer as a Network Server” in Chapter 4.

If you have any trouble using your password, try the following:

1. If you think you know the correct password, reset the computer and try again. See Chapter 3 for instructions.
2. If you know the current power-on password but you want to change or delete it, see Chapter 3 for instructions. (You cannot change or delete a power-on password and remain in network server mode.)
3. If you entered a password and then saw the following message, you need to change a jumper setting inside the computer:

TURN OFF POWER AND CORRECT JUMPER
SETTING TO ENABLE PASSWORD CHECKING

Remove any diskettes, turn off the computer, and follow the instructions under “Changing the Jumper Settings” in Chapter 5 to enable the password function by setting jumper JP13 to position B.

4. If you do not know the current power-on password and you do not want to set a new one, see “Removing a Password” below.
5. If you do not know the current power-on password and you want to set a new one, see “Setting a New Password” below.

Removing a Password

If you have forgotten your password and you do not want to set a new one, there are two ways to remove the current password:

- Disable the existing password
- Disable the password function.

To do either of these procedures, you must reset a jumper on the main system board.

Note

If you are using network server mode and you remove the password, the computer automatically turns off network server mode.

You should disable the existing password if you want to be able to set a new password later without having to reset a jumper again. See “Disabling an existing password,” below, for instructions.

If you disable the password function, you cannot set a new password unless you perform the steps to disable the existing password at that time. If you do not want to use a password anymore, follow the instructions under “Disabling the password function” below.

Disabling an existing password

If you do not know your power-on password and do not want to set a new one, follow these steps to disable the existing password:

1. Turn off the computer and follow the instructions under “Changing the Jumper Settings” in Chapter 5 to disable the password function by setting jumper JP13 to position A.
2. Insert the Reference diskette in drive A and turn on the computer. You do not see the key prompt.
3. When the Operation Menu appears, highlight Set up and press **Enter**. Then see “Setting the Power-on Password” in Chapter 2 and follow the instructions as if you are going to enter a new password. However, when you see the prompt to enter a password, press **Enter** immediately. This clears out the existing password.

Be sure to save the password setting and highlight
* * EXIT AND SAVE * * when you leave Setup.

4. Remove the Reference diskette, turn off the computer, and follow the instructions under “Changing the Jumper Settings” in Chapter 5 to enable the password function by setting jumper JP13 to position A.
5. If you do not have a hard disk, insert the Startup diskette in drive A. Turn on the computer again. You do not see the key prompt and the computer loads MS-DOS.

Later, if you want to create a power-on password, run Setup and enter a password. The jumper is already in the correct position.

Disabling the password function

If you do not want to use a power-on password anymore, you can disable the password function. However, if you want to use the password function later, your old password is still stored as the current password. If you want to be able to easily set a password later, follow the instructions in “Disabling an Existing Password,” above.

To disable the password function, follow the instructions under “Changing the Jumper Settings” in Chapter 5 to change the setting of jumper JP13 to position A.

Setting a New Password

If you have forgotten your current power-on password and want to set a new one, follow these steps:

1. Turn off the computer and follow the instructions under “Changing the Jumper Settings” in Chapter 5 to disable the password function by setting jumper JP13 to position A.
2. Insert the Reference diskette in drive A and turn on the computer. You do not see the key prompt.
3. When the Operation Menu appears, highlight `Setup` and press **Enter**. Then follow the instructions under “Setting the Power-on Password” in Chapter 2 to enter a new password. (If you want to enable network server mode, highlight `Network Server Mode` and press **Enter** to turn on the function.)

Be sure to save your password setting and highlight
`** EXIT AND SAVE **` when you leave Setup.

4. After you exit Setup, you see this message:

```
TURN OFF POWER AND CORRECT JUMPER  
SETTING TO ENABLE PASSWORD CHECKING
```

5. Remove the Reference diskette, turn off the computer, and follow the instructions under “Changing the Jumper Settings” in Chapter 5 to enable the password function by setting jumper JP13 to position B.
6. If you do not have a hard disk, insert the Startup diskette in drive A. Turn on the computer. You see the key prompt (○— π) If you enabled network server mode, you do not see the key prompt. Enter your new password to access the system. (See “Using the Power-on Password” in Chapter 3 or “Using a Password in Network Server Mode” in Chapter 4.)

Note

Be sure to remember your new password or write it down and keep it in a safe place. If you forget the password you enter now, you may have to repeat the procedure above the next time you turn on your computer.

Keyboard Problems

If you are having trouble with the keyboard, check the following:

1. If the screen displays one of the following keyboard errors when you turn on or reset the computer, make sure the keyboard is securely connected to the computer:
 - 301 Keyboard error
 - 303 Keyboard or system unit error
 - 304 Keyboard or system unit error.

See “Connecting the Keyboard” in Chapter 1 for instructions.

2. If the cursor keys do not work properly, the num lock function may be on. When num lock is on, the numeric/arrow keys on the numeric keypad work only as numbers. Check to see if the **Num Lock** indicator in the upper right corner of the keyboard is lit; if it is, press the **Num Lock** key to turn off the function.

If you want to change the initial setting of the num lock function when you turn on the computer, see “Using the Keyboard and Speaker Options” in Chapter 2.

3. If nothing happens when you type on the keyboard, see “The Computer Does Not Respond,” above.

Monitor Problems

For monitor problems, check the following:

1. If there is no display on the screen, check that the monitor’s power switch is on and that the power light on the monitor is lit. If the power light is on but you still do not see anything on the screen, check the monitor’s brightness and contrast controls.
2. Did you run the SNOOZE utility? Your screen may be just temporarily blank. Press any key to display the current image (or activity). If you still see nothing, see the instructions for using the SNOOZE program in Appendix A.
3. If the power switch is on but the power light is not, turn off the monitor’s power, wait five seconds, and turn the power back on. Wait to see if the screen displays any text.
4. If the monitor’s power light still does not come on, check the electrical outlet for power. Turn off your monitor and unplug it from the wall outlet. Plug a lamp into the wall outlet and turn it on to see if the outlet supplies power.

5. If you still do not see anything on the screen, make sure your monitor is connected to the computer properly. See “Connecting a Monitor” in Chapter 1 for more details. Also check the monitor manual for instructions on how to connect it to the computer.
6. Make sure your monitor and display adapter match, and, if you installed a display adapter card, be sure any switches or jumpers on the card are set properly. See “Connecting a Monitor” in Chapter 1 and the documentation that came with your monitor and display adapter card for instructions.
7. Be sure you have chosen the correct display adapter type in the Setup program. See “Setting the Display Adapter Type” in Chapter 2.
8. If you are running an application program, see if you need to set up the program for the type of monitor and display adapter you have. Also make sure you are using the appropriate monitor and display adapter for your software.

Note

If your application program requires a monitor that supports graphics but you have a monochrome monitor, the results will be unpredictable.

9. If you installed an EGA or VGA display adapter card, or another type of card that you want to be the primary display adapter, you must set jumper JP14 to disable the built-in VGA adapter. Otherwise, you will not see any display on the screen. See “Changing the Jumper Settings” in Chapter 5 for instructions.

If you are using one or more display adapter cards, you may need to change the setting of jumper JP12. This jumper tells the computer whether you are using a color or monochrome monitor. (JP12 is set for color at the factory.)

If the jumper is set incorrectly, you will see one of these messages:

- ❑ 401 CRT error
- ❑ 501 CRT error.

If you are using two different types of video cards, set jumper JP12 to the primary monitor type. You may also need to change the setting later if you change the type of monitor you are using. See “Changing the Jumper Settings” in Chapter 5 for instructions.

10. If you are still having difficulty with your monitor, run either the Monochrome Display Adapter and CRT check or the Color Graphics Adapter and CRT check, described in Appendix E. If the diagnostics program indicates an error, contact the place where you bought the monitor.

Diskette Problems

You may see the following message if you are having trouble with a diskette or your diskette drive:

601 Diskette error

If you see this message or have trouble accessing data on a diskette, try the following steps:

1. Did you turn down the diskette drive latch on a 5¼-inch drive to secure the diskette in the drive? See Chapter 3 for more information.
2. You may have inserted the diskette upside-down or it may not be inserted all the way. Remove the diskette from the drive and reinsert it with the label facing up. Be sure to turn down the diskette drive latch. (See Chapter 3 for detailed instructions on inserting and removing diskettes.)

3. If reinserting the diskette does not solve the problem and you have access to another diskette drive of the same type, place the diskette in the other drive and repeat the operation. If this works, the trouble may be in your diskette drive. See “Diskette Drive Problems,” below.
4. Check to see if you have inserted the right type of diskette. Follow these guidelines:
 - ❑ In a 1.2MB drive, use 5¼-inch, double-sided, high-density, 96 TPI diskettes. You can also use a 360KB diskette, but if you write to it in this drive, you may have trouble using it in a 360KB drive later.
 - ❑ In a 1.44MB drive, use 3½-inch, double-sided, high-density, 135 TPI diskettes. This type of drive can also read and write to 720KB diskettes.
 - ❑ In a 360KB drive, use 5¼-inch, double-sided, double-density, 48 TPI diskettes. You cannot use 1.2MB diskettes in this drive.
 - ❑ In a 720KB drive, use 3½-inch, double-sided, double-density, 135 TPI diskettes. You cannot use 1.44MB diskettes in this drive.

See “Types of Diskette Drives” in Chapter 3 for more information.

5. If your diskette is the right type for your drive, see if it is write-protected. On a 5¼-inch diskette, there may be a write-protect tab over the notch on its side or there may be no notch. On a 3½-inch diskette, the write-protect switch may be set to the write-protect position or there may be no switch. You cannot alter data on a write-protected diskette. (Some application programs do not function properly if the diskette is write-protected. Check the program manual.) See Chapter 3 for more information.

6. Is the diskette formatted? A new diskette must be formatted before you can store data on it. See your MS-DOS Reference Manual for instructions on formatting diskettes.
7. You may have entered an incorrect diskette drive type when you ran the Setup program. Run the Setup program again to check the setting. See Chapter 2 for instructions.
8. Did you receive one of the following MS-DOS error messages?
 - Disk Drive Error: Abort, Ignore, Retry?
 - Disk error reading drive d:
 - Disk error writing drive d:

If you see one of these messages, make sure the diskette is properly inserted in the drive. On a 5¼-inch diskette drive, make sure the drive latch is closed. Try the operation again. If the problem persists, try removing the diskette and reinserting it. This may solve the problem if the diskette was not seated properly in the drive.

If the error message still occurs, you may have a defective diskette. Use the MS-DOS COPY command to copy the files from the bad diskette to a new diskette. (See your MS-DOS Reference Manual for instructions.)

9. If you see no error messages but there is something wrong with the data in a file, MS-DOS or an application program may have updated the storage information on the diskette incorrectly. This is probably the case if you have one of these problems:
 - Part of a file is missing
 - A file includes parts of other files
 - An expected output file is missing.

To make the necessary repairs, use the MS-DOS program CHKDSK. See your MS-DOS Reference Manual for instructions.

Diskette Drive Problems

You may see the following message if you are having trouble with a diskette or your diskette drive:

601 Diskette error

If you see this message or have difficulty with a diskette drive, follow these steps:

1. Try running the Diskette Drives and Controller Check described in Appendix E. If the diagnostics program indicates an error, consult your Epson dealer.
2. If the diskette drive is making loud noises, do not attempt any further examination of it. Contact your Epson dealer.

Note

Diskette drives may make different sounds with different diskettes.

3. If your diskette drive read/write heads are dirty, you may occasionally see this MS-DOS error message:

```
Error Reading Drive d:  
Abort, Retry, or Fail?
```

To clean the read/write heads, use a diskette drive head cleaning kit, available in most computer stores. However, do not use a cleaning kit too often because excessive cleaning can damage your drive heads.

Hard Disk Problems

If you are having problems with the hard disk in your computer, you may see one of the following error messages:

- 1760 Disk 0 parameter failure
- 1761 Disk 1 parameter failure
- 1770 Disk 0 parameter error
- 1771 Disk 1 parameter error
- 1780 Disk 0 failure
- 1781 Disk 1 failure
- 1782 Disk controller failure
- 1790 Disk 0 error
- 1791 Disk 1 error.

Try the following steps:

1. Be sure you have installed MS-DOS on the hard disk as described in the MS-DOS Installation Guide.
2. Did you enter an incorrect hard disk drive type when you ran the Setup program? Check the hard disk drive type table in Chapter 2 for a list of the types available. If you entered user-defined parameters to configure your hard disk, see the documentation that came with your hard disk to ensure that you use the correct parameters.
3. If you have installed MS-DOS on the hard disk but it does not load MS-DOS when you turn on the computer, it may be missing one of the MS-DOS system files. Turn off your computer and insert your Startup diskette into drive A. Then turn on your computer again.

Type **C :** and press **Enter** to log onto the hard disk. If this works, the next step is to make sure the **COMMAND.COM** file is in the root directory of the hard disk. Type **DIR** and press **Enter**.

If **COMMAND.COM** is in the root directory, use the **MS-DOS COMPARE** command to compare the **COMMAND.COM** file on your diskette with the **COMMAND.COM** file on the hard disk. (See your **MS-DOS Reference Manual** for instructions on using **COMPARE**.) If the files do not match, use the **COPY** command to replace the file on the hard disk with the file on your diskette. Type the following and press **Enter**:

```
COPY A:COMMAND.COM C:
```

Remove the Startup diskette and press the **RESET** button to reset the computer. If the computer loads **MS-DOS** from the hard disk, you may have corrected the problem.

4. If the hard disk still does not work, the root directory of your hard disk may be missing some hidden system files. (Hidden files are not listed when you use the **DIR** command.)

Insert the Startup diskette and type **A :** to log onto drive A. Then type the following and press **Enter** to copy the hidden system files from your Startup diskette to the root directory of the hard disk:

```
SYS c:
```

Remove the Startup diskette and reset the computer to see if it loads **MS-DOS** from the hard disk.

5. If you can load **MS-DOS** from your Startup diskette but you cannot access data stored on your hard disk, you may have accidentally repartitioned or reformatted part or all of the disk.

Use the Display Partition Information option of the FDISK program to see if your hard disk has an active (bootable) DOS partition on it. (See the MS-DOS Reference Manual for instructions on using FDISK.) If it does not, back up all your hard disk files and then reinstall MS-DOS on the hard disk. See your MS-DOS Installation Guide for instructions.

If the disk does have an active DOS partition, back up all your files and then try reformatting the disk using SELECT. See your MS-DOS Installation Guide for instructions.

Caution

Reformatting destroys all the data currently on your hard disk, so do this only after careful consideration and after trying the preceding step.

6. If your hard disk is producing a lot of read/write errors or you are having other serious problems with it, try running the Hard Disk Drive and Controller diagnostics check, described in Appendix E. If the program indicates an error, contact your Epson dealer.
7. If you have been using your hard disk for a long time and begin to see numerous read/write errors, the magnetic signals on the disk may be getting weak. If this is the case, you may need to reformat the hard disk. If you decide to do this, follow these steps:
 - Back up all the data on the disk using COPY, XCOPY, or BACKUP (described in the MS-DOS Reference Manual).
 - Follow the instructions in Appendix C to perform a low-level (physical) format.
 - Follow the instructions in the MS-DOS Installation Guide to install MS-DOS on the hard disk.

8. If you have installed a hard disk drive made by another company in your computer, you need to install MS-DOS. See the MS-DOS Installation Guide for instructions. If the hard disk needs a low-level format, do that before you install MS-DOS. (See Appendix C for instructions.)
9. If your computer came with a hard disk drive that you are no longer using, be sure the cable leading from that drive to the main system board and the hard disk drive power cable are disconnected.

Software Problems

If you are having trouble with an application program, try the following solutions:

1. If the application program does not start, check that you are following the correct procedure for starting the program, and that it is installed correctly. If you have a hard disk and the program is stored in a directory on that drive, make sure you are logged onto or specifying the correct directory. If you don't have a hard disk, make sure you have inserted the application program diskette in the top drive (usually drive A).
2. Your computer can run at either high speed (25 MHz) or low speed (simulated 8 MHz). While almost all programs work properly at the faster speed, some must run at the slower speed. Check your software manual to see if this is the case, and change the processor speed if necessary. See "Changing the Processor Speed" in Chapter 4 for instructions and for information on accommodating copy-protected programs.

3. If you have entered an MS-DOS command that you want to stop, there are special key combinations you can type to tell MS-DOS to stop what it is doing. These methods may also work in your application programs.

To interrupt an MS-DOS command while it is executing, try one of the following commands:

- Hold down the **Ctrl** key and press **C**
 - Hold down the **Ctrl** key and press **Break**.
4. An application program can occasionally lock the computer, making it unresponsive to the keyboard. If your computer does not respond when you type on the keyboard, you can reset it. Follow the instructions in Chapter 3.

Printer Problems

Below are some general steps to follow if you are having difficulty with your printer. If the problem persists and you need more detailed information, check your printer manual. You may see one of the following error messages:

- 901 Parallel port error
- 1101 Serial port error.

These error messages appear if you are having trouble with the port to which your printer is connected. If it is connected to the parallel port, you may see error number 901; if your printer uses the serial port, you may see error number 1101.

1. If your printer does not work correctly immediately after you install it, check that the printer has power and is properly connected to the computer. (Also, make sure your printer has paper in it.) See Chapter 1 or your printer manual for instructions.

2. Check the printer manual for the printer's correct DIP switch or control panel settings. These settings help a printer communicate properly with the computer.
3. If you are using more than one parallel port or more than one serial port, the computer must know which port is the primary port and which is the secondary port. See Chapter 2 for instructions on how to set the parallel and serial ports using the Setup program.
4. If your printer is properly set up but is still not functioning, test it from the MS-DOS level. When the screen displays the MS-DOS command prompt (such as C> or A>), hold down **Shift** and press **Print Screen**. This should print the contents of the screen on your printer.

If it does not, you may need to change the internal setting of the computer's parallel port for a parallel printer (or serial port for a serial printer). To do this, use the MS-DOS **MODE** command or the **MENU** utility. See your printer manual and the MS-DOS Reference Manual for more details.

5. Many application programs (such as word processors) must be set up properly before they can use a printer. Check your program manual to see what customizing may be required.
6. Try running the Parallel Port (Printer Interface) check if you have a parallel printer, or the Serial Port (RS-232C) check if you have a serial printer. Appendix E describes these diagnostics checks. If the diagnostics test indicates an error, contact the place where you bought the printer.

Option Card Problems

If you install an option card and it is not functioning properly, check the following:

1. Is the option card installed correctly? The most common problem with option cards is a loose connection. Make sure the option card is well-seated in its slot. Check the installation procedure described in Chapter 5 and also see the instructions that come with the option card.
2. Did you set the necessary DIP switches or jumpers on the option card? See your option card manual for instructions.
3. Did you set the necessary jumpers on the main system board? See Chapter 5 for more information.
4. Did you run the Setup program to redefine your computer's configuration after installing the card? See Chapter 2.
5. Did you install a hard disk drive that has its controller on an option card? If so, and if your computer came with a hard disk drive that you are no longer using, be sure the cable leading from that drive to the main system board and the hard disk drive power cable are disconnected.
6. Did you install a network option card in your computer? Some network option cards require your computer to generate an early input/output ready signal to operate properly. If you are having trouble using your network card, set jumper JPI on the main system board to position A to enable the early input/output ready signal. Then try using the network card again. If it still does not operate correctly, contact your dealer.
7. If you used the option card to add an external device to your computer, did you use the proper cable to connect the device to the option card connector on the back panel?

8. Did you perform the correct setup procedures for the software you are using with the option card? If necessary, see your software manual for instructions on running the software setup procedure.

Mouse Problems

If you are having a problem with your mouse, you may see one of the following error messages:

- 8601 Auxiliary device failure
- 8602 Auxiliary device failure
- 8603 Auxiliary device failure.

If you see one of these messages, check the following:

- Be sure that the mouse cable is securely connected to the mouse port and not the keyboard port. See Chapter 1 for more information.
- If you installed a mouse on an option card, be sure to set jumpers JP11 and JP12 to disable the built-in mouse and enable the mouse on the card. See Chapter 5 for instructions.

If you are controlling your mouse with the Microsoft mouse driver, version 7.0, and the cursor is not operating properly within a program, you may need to install the MOUSE7PT.EXE program, described below. For example, the cursor may freeze or move incorrectly when you use the AutoCAD program.

Using the MOUSE7PT.EXE Program

The MOUSE7PT.EXE program creates an additional mouse driver which you can then load for any program that has trouble controlling the cursor. Your original mouse driver remains unchanged.

Note

If you are using Microsoft Windows 3.0, you do not need to install this program to patch the mouse driver; Windows 3.0 automatically creates a new driver for you.

Follow these steps to install and run MOUSE7PT.EXE:

1. Identify the disk and directory where the current MOUSE.COM file is stored.
2. Insert your Reference diskette in drive A.
3. Use the COPY command to copy MOUSE7PT.EXE from your Reference diskette to the directory on your hard disk that contains the MOUSE.COM file. (See your MS-DOS Reference Manual for instructions on using the COPY command.)
4. Log onto the directory that contains the MOUSE7PT.EXE and MOUSECOM files.
5. Type the following and press **Enter** to run the program:

```
MOUSE7PT  MOUSE.COM  newmouse.COM
```

(where *newmouse . COM* is the name you give the new driver file.)

This command creates a new mouse driver that has been modified to eliminate the cursor problem. When you name the new driver, be sure to make the extension .COM.

If you have included the file `MOUSE.SYS` in your `CONFIG.SYS` file, repeat step 5 to modify the `.SYS` file as well. Just substitute `.SYS` for `.COM` in the instructions.

When you are going to use the program with which you had the mouse problem, you need to load the new mouse driver into the computer's memory. There are two ways to do this:

- ❑ Type the name of the new mouse driver at the MS-DOS command prompt and then start the program.
- ❑ Modify your `AUTOEXECBAT` file (or another batch file) to include the name of the new mouse driver. See your MS-DOS Reference Manual for instructions.

Note

If you have already loaded the original mouse driver, reset the computer before you load the new one.

Memory Module Problems

If you added extra memory to your system by installing SIMMs and that memory is not operating properly, check the following:

1. Check to make sure that you set the memory configuration jumpers correctly and that they match your current SIMM configuration. See Chapter 5 for instructions on setting jumpers JP4 through JP8.
2. If the jumpers are set correctly but the memory count displayed by the power-on diagnostics program is incorrect, you or your dealer may not have installed the SIMMs correctly. They may be installed in the wrong sockets, they may be the wrong type of SIMM, or they may not be inserted all the way into their sockets. (Keep in mind that the memory count does not include the 384KB of memory between 640KB and 1MB.)

If your dealer installed SIMMs for you, contact your dealer; do not attempt to correct the problem yourself. If you installed the SIMMs, see “Adding Memory Modules” in Chapter 5 and make sure you have followed all the necessary instructions.

3. Be sure to run the Setup program after you install or remove memory modules to automatically update your memory configuration. See Chapter 2 for instructions.
4. If you are still having trouble with your SIMMs, write down any error messages that appear and contact your dealer.

Math Coprocessor Problems

If your math coprocessor does not seem to be operating properly, check the following:

1. Run the Setup program on your Reference diskette and check to make sure that the math coprocessor is listed as `installed` on the Exit display. If it is listed as `not installed`, you or your dealer may have installed the math coprocessor incorrectly. See Chapters 2 and 5 for more information.

Caution

Do not attempt to remove the math coprocessor yourself. Contact your dealer for information about a special extraction tool that is needed to remove it.

2. If your math coprocessor is listed as `installed` in the Setup program but still does not seem to be working, check the manual that came with the math coprocessor for any additional procedures you may need to perform or any troubleshooting information.

3. If you are still having trouble with your math coprocessor, test it by running the System diagnostics program on your Reference diskette. See Appendix E for instructions. If your math coprocessor came with its own diagnostic program, check the documentation that came with it and run those tests also.

Performing System Diagnostics

This appendix describes how to check the operation of the main unit and peripheral devices of your computer. You check these devices using the diagnostics program on your Reference diskette.

Run the diagnostics program if you are not sure whether a device is performing correctly. The table at the end of this appendix lists the error messages you may see during testing.

You can test the following devices, each of which is identified by specific reference numbers:

- 1 - System board
- 2 - Memory
- 3 - Keyboard
- 4 - Monochrome display adapter and CRT
- 5 - Color graphics adapter and CRT
- 6 - Diskette drives and controller
- 7 - Math coprocessor
- 9 - Parallel port (printer interface)
- 11 - Serial port (RS-232C port)
- 12 - Alternate serial port
- 14 - Dot-matrix printer
- 17 - Hard disk drives and controller
- 21 - Alternate parallel port
- 81 - Parallel port (on video adapter)

Starting System Diagnostics

To run the System diagnostics program, you must turn on or reset your computer with the Reference diskette in drive A. If you start this program in any other way, some tests may produce strange results.

To start the System diagnostics program, follow these steps:

1. Insert the Reference diskette in drive A.
2. Turn on or reset the computer. The Operation Menu appears.
3. If the Num Lock indicator is illuminated, press Num Lock to turn off the function.
4. Press 3 or use 1 to select System diagnostics and then press **Enter**.

When you start the System diagnostics program, the computer checks any peripheral devices that are connected to the system. Then you see a list of the devices available for testing. This list includes only the devices that are part of your system, such as the following, for example:

```
DEVICE LIST

 1 - System board
 2 - Memory
 3 - Keyboard
 5 - Color graphics adapter and CRT
 6 - Diskette drives and controller
 9 - Parallel port (printer interface)
11 - Serial port (RS-232C port)
14 - Dot-matrix printer
17 - Hard disk drives and controller

DEVICE LIST is correct ? (Y/N)
```


If the list correctly describes your system, make sure Y is highlighted and press **Enter**. If a device is missing from this list, or if you want to change the list, press **N** or **→** and **Enter**. Then see “Modifying the Device List” on page E-5.

Note

If your system uses the built-in VGA adapter or an EGA or VGA card with a color monitor, your device list should include item 5, Color graphics adapter and CRT. If your system uses the built-in VGA adapter or an EGA or VGA card with a monochrome monitor, your device list should include item 4, Monochrome display adapter and CRT.

After you confirm the Device List, you can test only those items. If you decide later that you need to add a device, you must return to the Operation Menu and reselect **System diagnostics**.

Note

After you have installed MS-DOS, you should always boot the computer from your hard disk or from the Startup diskette to use MS-DOS. When you are finished running system diagnostics, remove the Reference diskette from drive A. If you do not have a hard disk, insert the Startup diskette. Then reset your computer to make sure it performs all the commands in the **CONFIG.SYS** and **AUTOEXEC.BAT** files.

Selecting an Option

When you are using the System diagnostics program, you often need to select an option from a menu. There are two ways to do this:

- ❑ You can use the arrow keys (↑ ↓ ← →) to highlight the option you want and then press **Enter** to select it.
- ❑ You can type the number of the desired option and press **Enter** to select it.

For example, you may see this menu:

```
1 - Run test one time
2 - Run test multiple times

0 - Exit
```

Suppose the first option is highlighted. If you want to select that option, just press **Enter** (because it is already highlighted). If you want to select option 2, you can either press 1 or 2; this causes the cursor block to move to that option. Then press **Enter** to select it.

Note

You can press **ESC** any time you want to leave the menu currently displayed and return to the previous one.

Modifying the Device List

If an installed device is missing from the Device List, you must add it to the list and test it carefully. At the following prompt, select N.

```
DEVICE LIST is correct ? (Y/N)
```

You see this menu:

```
1 - Add device
2 - Delete device

0 - Finish modification
```

To add a device to the list, select 1. The program displays a list of other devices that are not currently included in the Device List. You see a menu similar to this:

```
Additional DEVICE LIST

4 - Monochrome display adapter and CRT
7 - Math coprocessor
12 - Alternate serial port
21 - Alternate parallel port
81 - Parallel port (on video adapter)

0 - Exit to DEVICE LIST
```

Highlight the item you wish to add and press **Enter**.

You can add as many devices as necessary. When the Device List is complete, select 0 (Exit).

To remove a device from the list, select 2 (Delete device). The screen displays the current Device List.

Select the item you wish to delete. You can delete as many devices as necessary.

When the Device List is correct, select 0. The screen displays the modified Device List for a final check and these options:

```
1 - Add device
2 - Delete device

0 - Finish modification
```

If the list is correct, select 0. You are now ready to select a test.

Selecting a Test

From the Device List, select the device you wish to test. Before the test begins, you are asked how many times to perform the test. You see this menu:

```
Number of times to test device

1 - Run test one time
2 - Run test multiple times

0 - Exit
```

You can specify that the test be performed one time only or any number of times in the range from 1 to 9999. Running a test multiple times is for reliability testing of essential functions only; in most cases, running a test only once is sufficient.

To perform the test once, select 1. The program may display a submenu of more detailed tests for the device you are checking.

To perform the test multiple times, select 2. You see this prompt:

```
Terminate checking if an error
detected ? (Y/N)
```

Select Y to terminate checking if the device produces an error, or N to repeat the tests regardless of an error. You see this prompt:

```
Repeat times (1-9999) ? 1
```

To perform the test once, press **Enter**.

If you wish to run the tests more than once, type the number of times and press **Enter**.

For some devices, the computer does not display a submenu of tests to choose from. Instead, it performs all the tests that do not require you to enter a response. If you chose to test the device more than once, the computer runs all the tests and then repeats them in the same order.

You may see this message on the screen during the tests:

```
On errors, press any key to stop
```

If you see an error while one of the tests is running, press any key to terminate the test.

Resuming From an Error

If an error occurs during a test, the test stops at that point, and an error code and error message appear. If you want to record the problem, you can print out the message on your printer. You see this prompt:

```
Do you want a printout of the error
message(s) ? (Y/N)
```

To continue without printing the error message, select N.

Before you request a printout, be sure your printer is ready and contains paper. Then select Y. If the printer is not ready, the following message and prompt appear:

```
Printer is not installed correctly.
Install correctly before entering.
Continue ? (Y/N)
```

Correct the problem and select Y to continue printing, or select N to cancel printing.

After printing the error message, the program displays this prompt:

```
Printout is finished. Press ENTER to
return to the menu.
```

The program continues after an error in one of the following ways:

- It returns to the Device List, or
- If you are running multiple tests and are not terminating on an error, the program repeats the test that caused the error.

The table below lists the tests you can run on the system's internal devices and on any optional devices you have installed. You may not see all of the tests listed when you run System diagnostics. Some tests appear only if you have installed certain types of equipment. The program displays the title of each check on the screen.

Tests that check the operation of parallel or serial ports require you to use a special connector in order to test the device. Contact your dealer to obtain the connector listed in the table below before beginning the tests.

For a complete list of the error codes and messages these tests may display, see the table at the end of this appendix.

System diagnostics tests

Device	Tests available	Description
System board		Checks the 80386 microprocessor
Memory		Checks all memory and displays a memory count
Keyboard		Tests all keys on the keyboard
Monochrome display adapter and CRT	Adapter check Attribute check Character set check Graphics mode check Screen paging check Video check Sync check Run all above checks	Tests all types of monochrome monitors

System diagnostics tests (continued)

Device	Tests available	Description
Color graphics adapter and CRT	Adapter check Attribute check Character set check Graphics mode check Screen paging check Light pen check Video check Sync check Run all above checks	Tests all types of color monitors
Diskette drive(s) and controller	Sequential seek check Random seek check Write, read check Disk change check Run all above checks	Tests operation of the diskette drive(s); requires a formatted diskette for some tests
Math coprocessor		Tests the operation of the math coprocessor
Parallel port (printer interface)		Tests the primary parallel port; requires a loop-back connector (contact your dealer)
Serial port (RS-232C)		Tests the primary serial port; requires a loop-back connector (contact your dealer)
Alternate serial port		Tests the secondary serial port; similar to primary serial port test

System diagnostics tests (continued)

Device	Tests available	Description
Dot-matrix		Tests the operation of a dot-matrix printer in several modes; requires the printer to be loaded with paper
Hard disk drive(s) and controller	Seek check Write, read check Read, verify check Run all above checks	Tests the operation of the hard disk drive(s)
Alternate parallel Port		Tests the secondary parallel port; similar to primary parallel port test
Parallel port on a video adapter		Tests the parallel port included on a video adapter; requires a loop-back connector (contact your dealer)

Error Codes and Messages

The following table lists all the error codes and messages that may appear during system diagnostics testing.

system diagnostics error codes and messages

Error code	Message
System board	
101	CPU ERROR
102	ROM CHECKSUM ERROR
103	TIMER COUNTER REGISTER ERROR
104	TIMER COUNTER ERROR
105	DMA CONTROLLER REGISTER ERROR
105	REFRESH ERROR
106	DMA PAGE REGISTER ERROR
107	KEYBOARD CONTROLLER TIMEOUT ERROR
108	KEYBOARD CONTROLLER SELF DIAGNOSTIC ERROR
108	KEYBOARD CONTROLLER WRITE COMMAND ERROR
109	INTERRUPT CONTROLLER ERROR
110	CMOS SHUTDOWN BYTE ERROR
111	CMOS BATTERY ERROR
112	CMOS CHECKSUM ERROR
113	CPU INSTRUCTION ERROR
114	PROTECT MODE ERROR 1
115	PROTECT MODE ERROR 2
Memory	
201	MEMORY ERROR
Keyboard	
301	8042 ERROR
301	KEYBOARD ERROR
302	KEYBOARD IS NON-STANDARD, OR KEYBOARD IS DEFECTIVE

System diagnostics error codes and messages (continued)

Error mode	Message
Monochrome display adapter and CRT	
401	ERROR IN ADAPTER CHECK
403	ERROR IN ATTRIBUTE CHECK
404	ERROR IN CHARACTER SET CHECK
406	ERROR IN GRAPHICS MODE CHECK
408	ERROR IN SCREEN PAGING CHECK
409	ERROR IN LIGHT PEN CHECK
410	ERROR IN VIDEO CHECK
411	ERROR IN SYNC CHECK
Color graphics adapter and CRT	
501	ERROR IN ADAPTER CHECK
504	ERROR IN CHARACTER SET CHECK
506	ERROR IN COLOR GRAPHICS CHECK
508	ERROR IN SCREEN PAGING CHECK
509	ERROR IN LIGHT PEN CHECK
510	ERROR IN COLOR VIDEO CHECK
511	ERROR IN SYNC CHECK
Diskette drive(s) and controller	
601	DISKETTE DRIVE CONTROLLER ERROR
602	SEQUENTIAL SEEK ERROR
603	RANDOM SEEK ERROR
604	WRITE ERROR
605	READ ERROR
606	DISK CHANGE CHECK REMOVE ERROR
607	DISK CHANGE CHECK INSERT ERROR
Math coprocessor	
701	COPROCESSOR NOT INSTALLED
702	COPROCESSOR INITIALIZE ERROR
703	COPROCESSOR INVALID OPERATION MASK ERROR
704	COPROCESSOR ST FIELD ERROR
705	COPROCESSOR COMPARISON ERROR
706	COPROCESSOR ZERO DIVIDE MASK ERROR
707	COPROCESSOR ADDITION ERROR
708	COPROCESSOR SUBTRACTION ERROR
709	COPROCESSOR MULTIPLICATION ERROR
710	COPROCESSOR PRECISION ERROR

System diagnostics error codes and messages (continued)

Error code	Message
Parallel port (printer interface)	
901	ERROR PIN <i>p</i>
Serial port (RS-232C port)	
1101	<i>con&o/</i> signal ALWAYS LOW
1101	<i>control</i> signal ALWAYS HIGH
1102	TIMEOUT ERROR
1103	VERIFY ERROR
Alternate serial port	
1201	<i>control signal</i> ALWAYS LOW
1201	<i>control signal</i> ALWAYS HIGH
1202	TIMEOUT ERROR
1203	VERIFY ERROR
Dot-matrix printer	
1401	<i>status</i>
Hard disk drive(s) and controller	
1701	SEEK ERROR
1702	WRITE ERROR
1703	READ ERROR
Alternate parallel port	
2101	ERROR PIN <i>p</i>
Parallel port (on video adapter)	
81nn	ERROR PIN <i>p</i>

Appendix F

Specifications

CPU and Memory

32-bit CPU	80386 microprocessor, 25 MHz system clock speed, 25 MHz or simulated 8 MHz processor speed, selectable through software or keyboard command 0 wait state memory access speed at 25 MHz
System memory	2MB RAM standard on SIMMs; base memory of either 256KB, 512KB, or 640KB, selectable through jumpers Memory expandable using 256KB or 1MB SIMMs up to 16MB (maximum); SIMMs must be 70ns access speed
ROM	128KB (includes system BIOS and VGA BIOS)
Shadow RAM	0 wait state access speed; automatically copies both ROM BIOS and video ROM into RAM
Math coprocessor	80387 (25 MHz) or Weitek 3167 (25 MHz) support; both may be used when a Weitek dual coprocessor adapter is installed to provide an additional socket (optional)
Clock/calendar	Real-time clock, calendar, and 50-byte CMOS RAM for configuration; battery backup

Cache controller	82385 (25MHz) standard
Cache RAM	32KB high-speed static RAM

Controllers

Diskette	Supports up to two drives in any of four formats: 5¼-inch, high-density, 1.2MB; 5¼-inch, double-density, 360KB; 3½-inch, high-density, 1.44MB; or 3½-inch, double-density, 720KB; controller on main system board
Hard disk	Supports up to two drives; embedded controller; interface on main system board

Interfaces

Monitor	VGA adapter with 1MB of video memory built into main system board; non-interlaced mode only; supports up to 800 x 600 or 1024 x 768 pixels in 16-colors or up to 640 x 480 pixels in 256-colors; multi-frequency monitor required for resolutions over 640 x 480 15-pin, D-shell connector
Serial	RS-232C, programmable, asynchronous; 9-pin, D-shell connector
Parallel	Standard 8-bit parallel, mono-directional; 25-pin, D-shell connector
Auxiliary	Mini DIN, 6-pin connector for PS/2 compatible mouse or other device

Keyboard	Mini DIN, 6-pin connector for PS/2 compatible keyboard
Option slots	Four standard input/output expansion slots (three 16-bit ISA compatible and one 8-bit ISA compatible); 8 MHz bus speed
Speaker	Internal; operation controllable by software

Power Supply

Type	140W, fan-cooled, automatic input voltage sensing
Input ranges	98 to 132 VAC and 195 to 264 VAC
Maximum outputs	+5 VDC at 18 Amps, +12 VDC at 4.2 Amps -12 VDC at 0.3 Amps, -5 VDC at 0.3 Amps +12 VDC at 6 Amps, peak (10 seconds)

Mass Storage

	Up to three half-height drives maximum (one vertical mount and two horizontal mounts) configurable using any of the following drive types:
Diskette drives	5¼-inch diskette drive, 1.2MB (high-density) storage capacity 3½-inch diskette drive, 1.44MB (high-density) storage capacity

5¼-inch diskette drive, 360KB
(double-density) storage capacity

3½-inch diskette drive, 720KB
(double-density) storage capacity

Hard disk drives 3½-inch form factor hard disk drive(s);
up to half-height size; first drive mounted
vertically, second mounted horizontally

Keyboard

Detachable, two position, 101 sculpted
keys

Layout 58-key QWERTY main keyboard;
17-key numeric/cursor pad; 10 cursor keys;
additional 4-key cursor pad; 16 function
keys (user-definable)

Function Four levels (normal, shift, control,
alternate); user-definable

Environmental Requirements

Condition	Operating range	Non-operating range	Storage range
Temperature	41° to 95° F (5° to 35° C)	-4° to 140° F (-20° to 60° C)	-40° to 140° F (-40° to 60° C)
Humidity (non- condensing)	20% to 80%	10% to 90%	5% to 95%
Altitude	-330 to 9900 ft (-100 to 3000 m)	-330 to 11880 ft (-100 to 3600 m)	-330 to 39600 ft (-100 to 12000 m)
Maximum wet bulb	68° F (20° C)	104° F (40° C)	134° F (57° C)

Physical Characteristics

Width	15 inches (374 mm)
Depth	16.75 inches (419 mm)
Height	6 inches (151 mm)
Weight (without keyboard)	Single diskette drive model: 20.75 lb (9.4 kg)

Glossary

Address

A number or name that identifies the location where information is stored in a computer's memory.

Analog monitor

A monitor that generates, responds to, or acts upon analog data. Analog data is transmitted by varying the voltage levels in a continuous current.

Application program

A software program designed to perform a specific task, such as a word processing or spreadsheet program.

ASCII

American Standard Code for Information Interchange. A standardized coding system for representing characters, such as numbers, letters, and graphic symbols. An ASCII character occupies one byte of storage. Many different computers, printers, and programs can use files transmitted in ASCII code.

Asynchronous

A method of data transmission in which one machine sends data one character at a time to another machine at irregular intervals that do not need to be synchronized to a timing device.

AUTOEXEC.BAT file

The batch file that is executed automatically when you load MS-DOS. See also Batch file.

Automatic speed

The feature that enables the computer to switch automatically from high speed (25 MHz) to low speed (simulated 8 MHz) when accessing a diskette drive.

Backup

An extra copy of a program, data file, or disk, that is created in the event your working copy is damaged or lost.

Base memory

The memory in the computer below 1MB that is available to MS-DOS and application programs-usually 640KB. Also called conventional memory or main memory.

Batch file

A type of file that lets you execute a series of MS-DOS commands by typing one command. Batch files are text files with the filename extension .BAT. In a batch file, each command is entered **on** a separate line. When you type the filename, MS-DOS executes all the commands in that file sequentially.

BIOS

Basic Input/Output System. Routines in ROM (Read Only Memory) that handle basic input/output functions of the operating system.

Bit

A binary digit (0 or 1). The smallest unit of computer storage. The value of a bit represents the presence (1) or absence (0) of an electric charge.

Boot

To load the operating system into the computer's memory.

Byte

A sequence or group of eight bits that represents one character.

Cache memory

A high-speed type of memory buffer that stores information from base or extended memory where your system can access it faster.

CGA

Color Graphics Adapter. A type of display adapter card that can generate up to 25 lines of text with 80 characters on each line, monochrome graphics at 640 x 200 resolution, or four-color graphics at 320 x 200 resolution.

Character

Anything that can be printed in a single space on the page or the screen; includes numbers, letters, punctuation marks, and graphic symbols.

CMOS

Complementary Metal-Oxide Semiconductor. A type of low-power silicon chip.

Code

A system of symbols for representing data or instructions. Also any software program or part of a program.

Command

An instruction you enter (usually on a keyboard) to direct your computer to perform a specific function.

Command prompt

The symbol or message that tells you MS-DOS is loaded and ready to receive instructions. The default command prompt displays the current drive and directory. If you are logged onto drive C, the command prompt may look like this: C : >.

Configuration

The particular setup of a group of components. A typical system configuration consists of a computer with one diskette drive, one hard disk drive, and a monitor, connected to a printer.

Control code

A command (generated when you hold down Ctrl and press another key on the keyboard) that instructs the computer to perform a specific function.

Conventional memory

The memory in your computer (up to 640KB) used by **MS-DOS** and application programs. Also called base memory or main memory.

Coprocessor

An optional device that enables the computer to process certain mathematical calculations faster.

Copy-protected program

A type of program that cannot be copied. Some copy-protected programs require you to leave the program diskette in the diskette drive while you are using it. Some also require the computer to be running at low speed (simulated 8 MHz) instead of high speed (25 MHz). See also Automatic speed.

CPU

Central Processing Unit. The primary unit of the computer that interprets instructions, performs the tasks you indicate, keeps track of stored data, and controls all input and output operations.

Cursor

The highlighted marker that shows your position on the screen.

Cylinders

The vertical alignment of tracks in a hard disk that can be lined up under one read/write head. The number of tracks on a disk is equal to the number of cylinders times the number of heads.

Data

Information such as text or graphics stored or processed by a computer.

Data diskette

A formatted diskette on which you store data files (as opposed to program files).

Default

Any value or setting that takes effect when the computer is turned on or reset. A default value stays in effect unless you override it temporarily by changing a setting or you reset the default value itself.

Delimiter

A character or space used to separate different parts of an MS-DOS command.

Device

A piece of equipment that is part of a computer system and performs a specific task, such as a disk drive, a monitor, or a printer.

Device driver

A file containing instructions that allow your computer to recognize and control a device. The Equity 386/25 PLUS comes with device drivers that provide extended and super-extended VGA features for various programs when used with a multi-frequency monitor.

Diagnostics

The tests and procedures the computer performs to check its internal circuitry and set up its configuration.

DIP switch

Dual Inline Package switch. A small switch on a computer, option card, or printer that controls a particular function.

Directory

A list of files stored in a particular area on a disk; part of a structure for organizing files into groups. A directory listing shows the name, location, and size of the files in the directory. A directory can contain both files and subdirectories.

Disk

The collective term for diskettes and hard disks.

Disk drive

The physical device that allows the computer to read from and write to a disk. A diskette drive has a disk slot into which you insert a diskette. A hard disk is sealed inside a protective unit.

Diskette

A flat piece of flexible plastic coated with magnetic material used to store data permanently.

Display adapter card

A circuit board that can be installed in one of the computer's option slots to provide the monitor interface. The display adapter card controls the way the monitor displays text and graphics. (In the Equity 386/25 PLUS, a VGA display adapter is built into the system board.) Also known **as Video card**.

DOS

Disk Operating System. A commonly used operating system that controls the computer's input and output functions. See Operating system.

Double-density

A type of diskette format that allows you to store twice as much data as the standard-density format. A 5¼-inch double-density diskette can store 360KB of data. A 3½-inch double-density diskette can store 720KB of data.

Drive **designator**

The letter name of a disk drive, followed by a colon-for example, C : .

EGA

Enhanced Graphics Adapter. A type of display adapter card that allows you to display high-resolution graphics on a compatible monitor. It can display up to 43 lines of text with 80 characters on each line, or it can display monochrome or 16-color graphics at up to 640 x 350 resolution.

Expanded memory

Memory that specially written MS-DOS application programs can use with an Expanded Memory Specification (EMS) device driver such as EMM386.SYS.

Extended Memory

Memory above 1MB that is accessed by the protected mode of the 80386 microprocessor and is available to some application programs and operating systems.

Extended VGA mode

Special features of the built-in VGA adapter available when you are using certain display drivers and a multi-frequency monitor. These features include 132-column text mode and resolutions up to 800 x 600 in 16 colors. See also Super-extended VGA *mode*.

Extension

A suffix of up to three characters that you can add to a filename to better identify it.

File

A group of related pieces of information called records, or entries, stored together on a disk. Text files consist of words and sentences. Program files consist of codes and are used by computers to interpret and carry out instructions.

Filename

A name up to eight characters long that MS-DOS uses to identify a file.

Fixed disk

See Hard disk.

Format

To prepare a new disk (or an old one you want to reuse) so that it can store information. Formatting divides a disk into tracks and sectors and creates addressable locations on it.

Graphics

Lines, angles, curves, and other nonalphanumeric data.

Hard disk

The enclosed unit used to store large amounts of data. Unlike a diskette, it is fixed in place. It can process data more rapidly and store many more files than a diskette. Also called fixed disk.

Hardware

Any physical component of a computer system, such as a monitor, printer, keyboard, or CPU.

High-density

A type of format that allows you to store more data than on single- or double-density diskettes. A 5¼-inch high-density diskette can store 1.2 MB of data. A 3½-inch high-density diskette can store 1.44 MB of data.

Input/output (I/O) port

See Port.

Interface

A physical or software connection used to transmit data between equipment or programs.

Jumper

A small device that connects two pins on an option card, a disk drive, or the main system board to activate a particular function.

Key disk

A diskette containing a copy-protected program that must remain in the diskette drive while you are using the program.

Kilobyte (KB)

A unit used to measure storage space in a computer's memory or on a disk. One kilobyte equals 1024 bytes.

LIM 4.0 EMS

Version 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification—a protocol that allows certain application programs to use memory that MS-DOS cannot use.

Main system board

The board built into your computer containing the circuitry the computer requires to operate.

Math coprocessor

An optional device that enables the computer to process certain mathematical calculations faster.

MCGA

Monochrome/Color Graphics Adapter. A type of display adapter that runs either a monochrome or color graphics monitor.

MDA

Monochrome Display Adapter. A type of display adapter that displays text in only one color, such as green or amber.

Megabyte (MB)

A unit used to measure storage space in a computer's memory or on a disk. One megabyte equals 1024KB.

Megahertz (MHz)

A unit used to measure oscillation frequency (of a computer's internal timing clock). A megahertz is one million cycles per second. The Equity 386/25 **PLUS** operates at 25 MHz or simulates an 8 MHz operating speed.

Memory

The area where your computer stores data. Memory contents can be permanent (ROM) or temporary (RAM).

Memory module

A small circuit board that contains memory chips. You can add 256KB or 1MB memory modules to the main system board inside the computer to expand the computer's memory. A memory module is commonly called a SIMM (single inline memory module).

Memory on card

The additional memory on an option card installed in the computer.

MGA

Multi-mode Graphics Adapter. A type of display adapter card that can display monochrome text and color graphics on the screen,

Microprocessor

A small version of a CPU contained on one semiconductor chip.

Modem

A device that allows a computer to transmit signals over telephone lines so it can send and receive data. Modem stands for MODulator/DEMulator.

Monitor

The piece of hardware that contains the screen and displays information.

Monochrome monitor

A monitor that displays in only one color, such as green or amber, as opposed to a color monitor which can display in several colors.

Mouse

A hand-held pointing device with one or more buttons. When you slide the mouse over a flat surface in a certain direction, the cursor moves in the same direction on the screen.

MS-DOS

Microsoft Disk Operating System. The operating system most commonly used with your computer. See *Operating system*.

Network server

The master computer in a network which provides storage space for the other computers connected to it. The network server can write files to and read files from the other computers in the network.

Network server mode

An optional password mode that provides extra security for a computer that is operating as a network server.

Non-interlaced mode

A technique used by the built-in VGA display adapter that refreshes all the lines on the monitor screen sequentially from top to bottom.

Numeric keypad

The number keys grouped to the right of the keyboard.

Operating speed

The speed at which the central processing unit can execute commands. The Equity 386/25 PLUS can run at 25 MHz or simulate an 8 MHz operating speed.

Operating system

A collection of programs (such as MS-DOS, MS OS/2, or UNIX) that manages a computer's operations. The operating system determines how programs run on the computer and supervises all input and output.

Option card

A circuit board you install inside the computer to provide additional capabilities, such as a modem.

Parallel

The **type** of interface that transmits all the bits in a byte of data simultaneously over separate lines. See Interface and Serial.

Parameter

A qualifier added to a command that tells MS-DOS what particular conditions to look for and specifies information such as what data you want to process and where to locate or store a file.

Parity

A method used to verify the accuracy of data transmissions by adding **a** bit that makes the total of the byte odd for odd parity or even for even parity.

Partition

(1) The area defined on a hard disk for use by an operating system; (2) to divide a hard disk into separate sections or logical drives. You can define a primary partition and one or more extended partitions on a hard disk.

Pathname

The list of directories and subdirectories you specify to locate a file. For example, the pathname for the file SALES which is located in the subdirectory BUSINESS of the root directory (\) is \ BUSINESS \SALES.

Peripheral

An external device (such as a printer or a modem) connected to a computer that depends on the computer for its operation.

Port

A physical input/output socket on a computer where you can connect a peripheral device.

Power-on diagnostics

Tests that the computer runs to check its internal circuitry and configuration each time you turn it on.

Power-on password

The sequence of characters you type after you turn on the computer in order to access and use your system. A power-on password can be up to seven characters long and can include letters, numbers, and blank spaces.

Processor speed

See Operating speed.

Program

A disk file that contains coded instructions and tells a computer what to do and how to do it.

Prompt

A message the screen displays to request information or tell you what action you need to perform next. See also Command prompt

RAM

Random Access Memory. The portion of the computer's memory used to run programs and store data while you work. All data stored in RAM is erased when you turn off or reset the computer; so you must store any data you want to keep on a diskette or hard disk.

Read

To move data from one area to another. For example, when you open a text file stored on disk, the computer reads the data from the disk and displays it on the screen.

Read/write head

The physical device inside a disk drive that reads and records data on the magnetic surface of a disk.

Real-time clock

A battery-powered clock inside the computer that keeps track of the time and date, even when the computer is turned off.

Reset

To reload a computer's operating system so you can retry a task or begin using a different operating system. Resetting erases all information in RAM.

RGB

Red Green Blue. A type of color monitor.

ROM

Read Only Memory. A portion of memory that can only be read and cannot be used for temporary storage. ROM retains its contents even when you turn off the power.

Root directory

The top-level directory in MS-DOS, designated by a \ (backslash). All other directories are subdirectories of the root directory or of other subdirectories.

RS-232C

A widely used, standard type of serial interface. You can easily connect an RS-232C compatible device to the built-in port on your computer.

Sector

A contiguous section of a disk track that provides an address at which the computer can access data.

Self test

The initial diagnostics procedures a system performs to check its hardware.

Serial

The type of interface that transmits data one bit at a time. See Interface and Parallel.

Shadow RAM

The feature provided by the Equity 386/25 PLUS that enables the computer to copy the ROM BIOS and video ROM into the RAM area of memory to speed up processing.

SIMM

See Memory module.

Software

The programs that enable your computer to perform the tasks and functions you indicate.

Subdirectory

A directory or group of files that branches down from another subdirectory or from the root directory.

Super-extended VGA mode

The 1024 x 768, 16-color graphics mode resolution available when you are using certain display drivers and a multi-frequency monitor capable of displaying that resolution. Super-extended VGA mode includes all of the features available in extended VGA mode. See also *Extended VGA mode*.

Switch

An option added to an MS-DOS command that modifies the way the command works. Switches are usually preceded by a / (forward slash). For example, if you add the /S switch to a FORMAT command, MS-DOS installs the operating system on the diskette as it formats it. See *Parameter*.

System diagnostics

A series of checks you can perform on the computer to make sure the hardware is functioning correctly.

System diskette

A diskette that contains the operating system.

Tracks

Addressable, concentric circles on a disk, resembling the grooves on a record, which help to divide the disk into separate accessible areas. There are 80 tracks on each side of a double-sided 1.2MB, 1.44MB, or 720KB diskette and 40 tracks on each side of a double-sided 360KB diskette. The number of tracks on a hard disk depends on its capacity.

VGA

Video Graphics Array. A type of high-resolution display adapter. The VGA adapter built into the system board of your computer can display 16-color graphics at resolutions up to 1024 x 768 or 256-color graphics at resolutions up to 640 x 480.

Video card

A display adapter card that can be installed in one of the computer's option slots to provide a monitor interface. Your computer comes with a built-in VGA adapter, so you do not need to install a video card in your system if you are going to use this interface.

Write

To store data on a disk.

Write-protect

To protect the data on a diskette from being changed by placing a write-protect tab over the notch on the side of a 5¼-inch diskette or by setting the write-protect switch on a 3½-inch diskette. When a diskette is write-protected, you cannot erase, change, or record over its contents.

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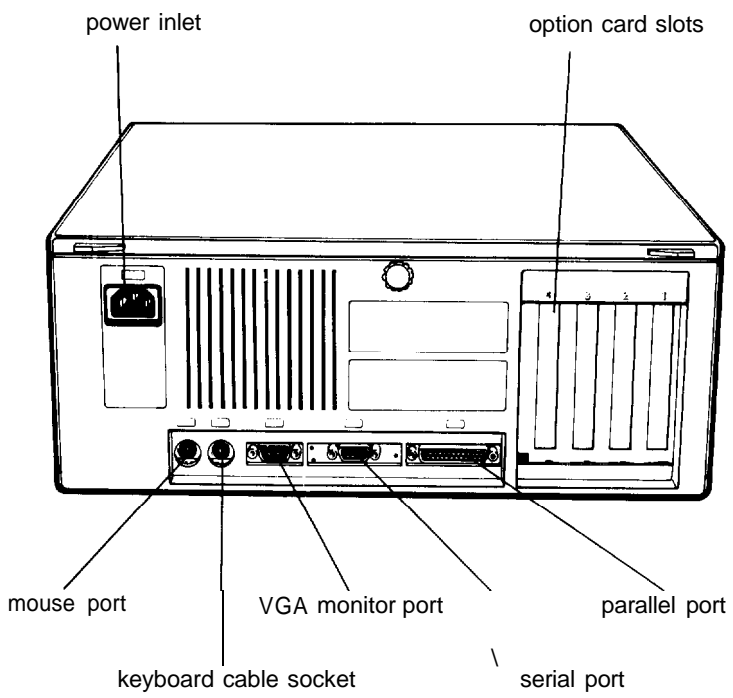
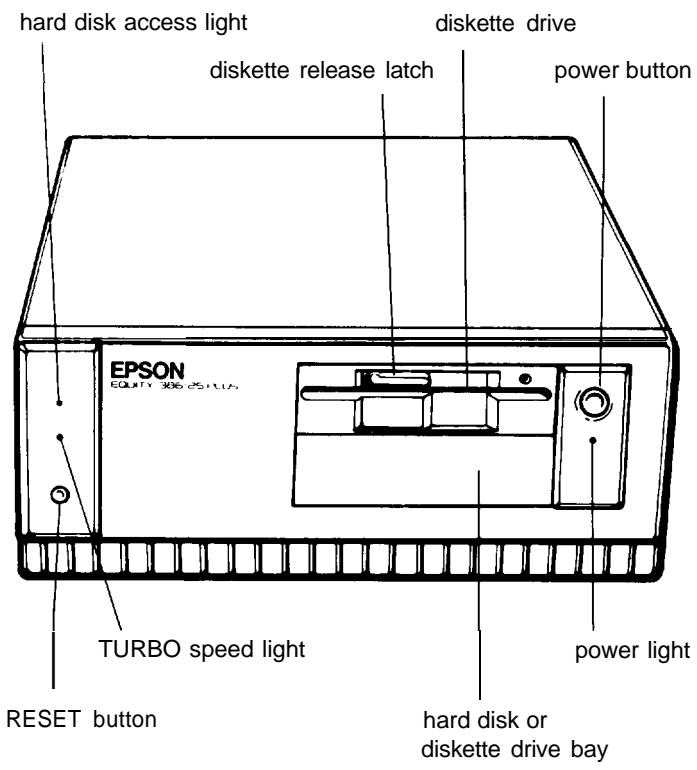
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